OCTOBER IS

# Caries Disease

AWARENESS MONTH

## CARIES DISEASE EXPOSED

What You're Missing Could Change Everything

**What You'll Learn:**

- ✓ Evidence-based perspectives on fluoride and alternatives
- ✓ Practical strategies for improving diet and behavior in kids
- ✓ How saliva testing can guide personalized caries care
- ✓ Risk-based, minimally invasive approaches for better outcomes

***Featured presenters:***

Susan Maples, DDS, MSBA

V. Kim Kutsch, DMD

Douglas Young, DDS, EdD, MS, MBA

Douglas Thompson, DDS, FAAMM, ABAAHP

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ACADEMY of GENERAL DENTISTRY
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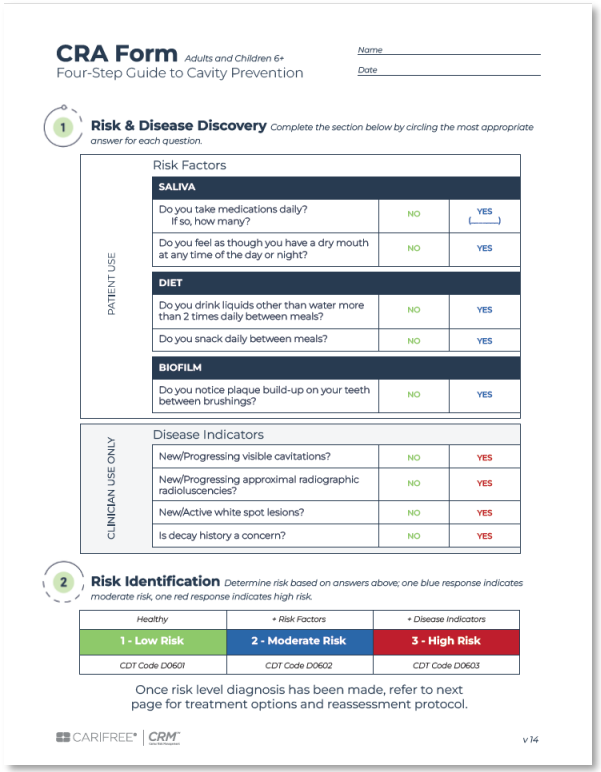
# GET INVOLVED!

Download Your FREE Caries Risk Toolkit Today.

www.cariesdisease.com



**CRA Form** *Adults and Children 6+*
Four-Step Guide to Cavity Prevention

Name _____
Date _____

**1 Risk & Disease Discovery** *Complete the section below by circling the most appropriate answer for each question.*

PATIENT USE

| Risk Factors | | |
|---|---|---|
| **SALIVA** | | |
| Do you take medications daily? If so, how many? | NO | YES (_____) |
| Do you feel as though you have a dry mouth at any time of the day or night? | NO | YES |
| **DIET** | | |
| Do you drink liquids other than water more than 2 times daily between meals? | NO | YES |
| Do you snack daily between meals? | NO | YES |
| **BIOFILM** | | |
| Do you notice plaque build-up on your teeth between brushings? | NO | YES |

CLINICIAN USE ONLY

| Disease Indicators | | |
|---|---|---|
| New/Progressing visible cavitations? | NO | YES |
| New/Progressing approximal radiographic radiolucencies? | NO | YES |
| New/Active white spot lesions? | NO | YES |
| Is decay history a concern? | NO | YES |

**2 Risk Identification** *Determine risk based on answers above; one blue response indicates moderate risk, one red response indicates high risk.*

| *Healthy* | *+ Risk Factors* | *+ Disease Indicators* |
|---|---|---|
| 1 - Low Risk | 2 - Moderate Risk | 3 - High Risk |
| *CDT Code D0601* | *CDT Code D0602* | *CDT Code D0603* |

Once risk level diagnosis has been made, refer to next page for treatment options and reassessment protocol.

CARIFREE® | CRM™ v 14

# *Key Concepts for Contemporary Caries Management*

Douglas A. Young, DDS, EdD, MBA, MS
Professor Emeritus
University of the Pacific

Email: dyoung@pacific.edu
Website: www.drdougyoung.com

# Today's Take-home Messages

1. Caries Risk Management (CRM) treats chemically at the patient level
2. SDF and Glass Ionomers treats chemically at the tooth level
3. Selective caries removal is minimally invasive

# Treating Caries Disease at the Patient Level

- Complete exam
- Caries risk assessment (CRA)
- Caries risk management (CRM)
  - Motivational interviewing and shared decision making
  - Behavioral change
  - Implemented interventions (products)
    - Biofilm modification
    - Halting demineralization
    - Enhancing remineralization


1. Calcium
2. Phosphate
3. Fluoride
4. pH 7
5. Biofilm modification

pH determines remin or demin
It's all about the pH!

# Caries Risk Assessment Made Simple

**Must do….**

1. **Bacterial Assessment**
2. **Saliva Assessment**

## Caries Risk Assessment Form

| | Low Caries Risk | Moderate Caries Risk | High Caries Risk | Extreme Caries Risk |
|---|---|---|---|---|
| ***Determining caries risk***<br><br>The checked box furthest to the right determines overall caries risk | □ No active caries lesion/radiolucency (cavitated or non-cavitated) during past 24 months<br><br>□ Healthy lifestyle habits including diet with little to no consumption of simple sugars, infrequent snacking, no drugs or alcohol abuse)<br><br>□ No visible plaque | □ No active caries lesion/radiolucency (cavitated or non-cavitated) during past 12 months<br><br>**1-2 of the following (check boxes):**<br>□ Unhealthy lifestyle habits including occasional (≤ 2 times per day) between-meal snacks of simple sugars, drug or alcohol abuse)<br>□ Inadequate oral hygiene or visible plaque<br>□ Wearing dental or orthodontic appliances<br>□ Susceptible pits & fissures<br>□ Exposed root surfaces<br>□ Saliva reducing factors (medications, radiation, systemic diseases) | □ Any active caries lesion/radiolucency (cavitated or non-cavitated) during the past 12 months<br><br>□ High bacterial load by measurement or observation (heavy plaque)<br><br>**3 or more of the following (check boxes):**<br>□ Unhealthy lifestyle habits including frequent (≥ 3 times per day) between-meal snacks of simple sugars, drug or alcohol abuse)<br>□ Inadequate oral hygiene<br>□ Wearing dental or orthodontic appliances<br>□ Susceptible pits & fissures<br>□ Exposed root surfaces<br>□ Saliva reducing factors (medications, radiation, systemic diseases) | □ High caries risk with hyposalivation by observation or measurement<br><br>□ High dependency on others for care |
| **Circle Overall Caries Risk** | **Low Caries Risk** | **Moderate Caries Risk** | **High Caries Risk** | **Extreme Caries Risk** |
| **Recall Interval** | 12 months | 6 months | 3 months | 3 months |
| **Radiographs** | 24-36 months | 18-24 months | 6-18 months | 6 months until no new lesions |

# Example Protocol University of the Pacific

**Must do….**

1. **Bacterial Assessment**
2. **Saliva Assessment**

**EXAMPLE CAMBRA PROTOCOL**

| Risk Level | Home Care Recommendations | Recall Interval | Radiographs |
|---|---|---|---|
| **Low** | OHI, individualized diet modification: frequency and exposure, OTC fluoride toothpaste | 12 months | 24-36 months |

# ADA CCS

JADA Feb 2015

COVER STORY

## The American Dental Association Caries Classification System for Clinical Practice

### A report of the American Dental Association Council on Scientific Affairs

Douglas A. Young, DDS, EdD, MBA, MS; Brian B. Nový, DDS; Gregory G. Zeller, DDS, MS; Robert Hale, DDS; Thomas C. Hart, DDS, PhD; Edmond L. Truelove, DDS, MSD; American Dental Association Council on Scientific Affairs

Dental caries remains a common chronic disease and, in the absence of treatment, it may progress until the tooth is destroyed. Despite advances in restorative materials and the implementation of various preventive approaches, more than 90% of adults in the United States have experienced dental caries before 30 years of age.[1,2]

Dental caries is a multifactorial disease involving many complex risk and protective factors.[3] The clinical presentation of caries disease is a caries lesion; the severity of the disease and of individual caries lesions is the result of complex personal, biological, behavioral, and environmental factors. Some factors are protective, such as the presence of fluoride in the biofilm, whereas others lead to hard tissue destruction, such as lower plaque pH.[4-6] Caries risk assessment is the organized process of evaluating these protective and pathogenic factors and provides the foundation[7-9] for selecting treatment interventions.


The dental profession continues to implement a more interceptive nonsurgical therapeutic model to prevent, treat, and reverse caries lesions, particularly in the early stages. Despite progress, the profession still

This article has an accompanying online continuing education activity available at: http://jada.ada.org/ce/home.


**ABSTRACT**

**Background.** The caries lesion, the most commonly observed sign of dental caries disease, is the cumulative result of an imbalance in the dynamic demineralization and remineralization process that causes a net mineral loss over time. A classification system to categorize the location, site of origin, extent, and when possible, activity level of caries lesions consistently over time is necessary to determine which clinical treatments and therapeutic interventions are appropriate to control and treat these lesions.

**Methods.** In 2008, the American Dental Association (ADA) convened a group of experts to develop an easy-to-implement caries classification system. The ADA Council on Scientific Affairs subsequently compiled information from these discussions to create the ADA Caries Classification System (CCS) presented in this article.

**Conclusions.** The ADA CCS offers clinicians the capability to capture the spectrum of caries disease presentations ranging from clinically unaffected (sound) tooth structure to noncavitated initial lesions to extensively cavitated advanced lesions. The ADA CCS supports a broad range of clinical management options necessary to treat both noncavitated and cavitated caries lesions.

**Practical Implications.** The ADA CCS is available for implementation in clinical practice to evaluate its usability, reliability, and validity. Feedback from clinical practitioners and researchers will allow system improvement. Use of the ADA CCS will offer standardized data that can be used to improve the scientific rationale for the treatment of all stages of caries disease.

**Key Words.** Caries classification system; caries lesion classification; caries location; caries extent; caries activity; caries management.

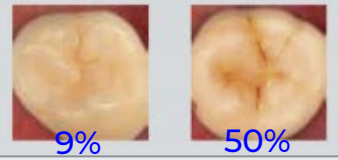
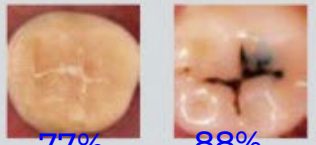
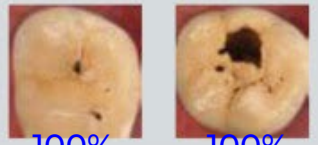
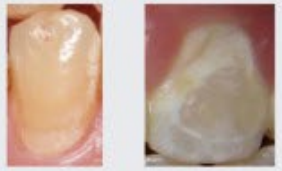
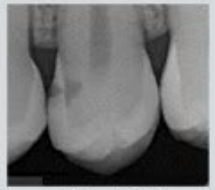
JADA 2015;146(2):79-86

http://dx.doi.org/10.1016/j.adaj.2014.11.018

JADA
Feb 2015

TABLE 2

**American Dental Association Caries Classification System.**

| | AMERICAN DENTAL ASSOCIATION CARIES CLASSIFICATION SYSTEM | | | |
|---|---|---|---|---|
| | **Sound** | **Initial** | **Moderate** | **Advanced** |
| **Clinical Presentation** | 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. |
| **Other Labels** | No surface change or adequately restored | Visually noncavitated | Established, early cavitated, shallow cavitation, microcavitation | Spread/disseminated, late cavitated, deep cavitation |
| **Infected Dentin** | None | Unlikely | Possible | Present |
| **Appearance of Occlusal Surfaces (Pit and Fissure)**[*,†] | ICDAS 0 | ICDAS 1 ICDAS 2 | ICDAS 3 ICDAS 4 | ICDAS 5 ICDAS 6 |
| |  |  9% 50% |  77% 88% |  100% 100% |
| **Accessible Smooth Surfaces, Including Cervical and Root**[‡] |  |  |  |  |
| **Radiographic Presentation of the Approximal Surface**[§] |  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 lesion |  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 |

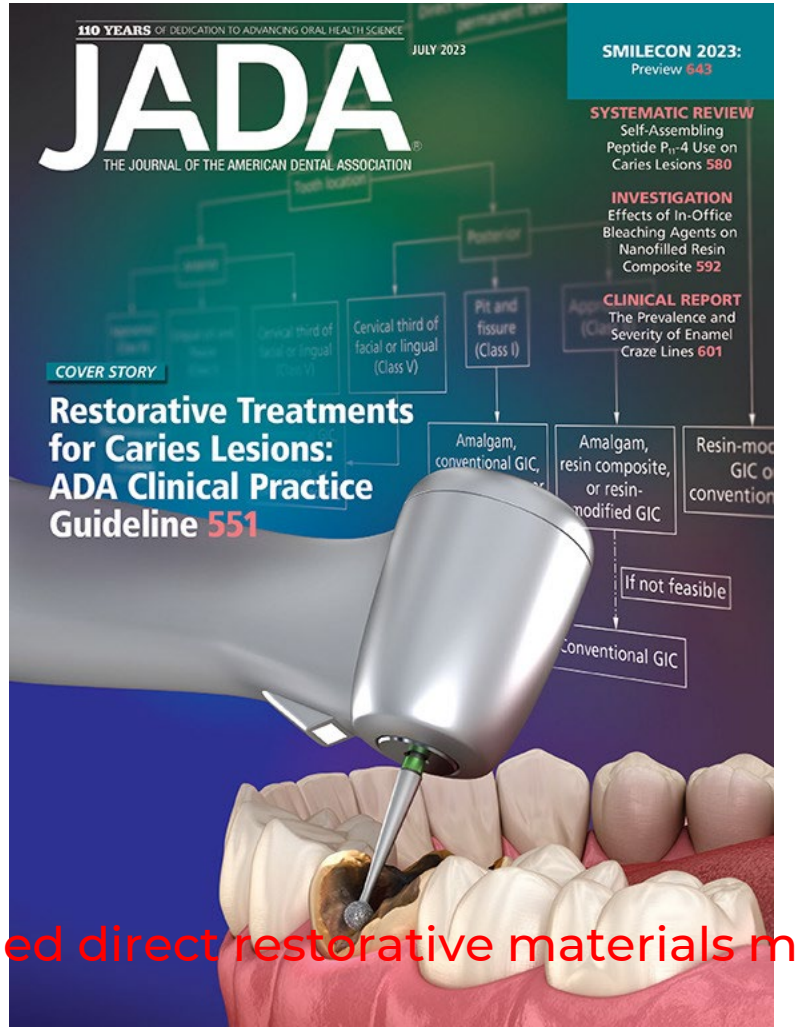
Use minimally invasive GI restoratives for moderate (D2) and advanced (D3) caries lesions only

# The Importance of Cavitation

Bacteria are too big to penetrate the enamel

# Using Glass Ionomer Restoratives

July 2023




"All included direct restorative materials maybe effective"

Clinical Practice Guideline

Cover Story

## Evidence-based clinical practice guideline on restorative treatments for caries lesions

A report from the American Dental Association

Vineet Dhar, BDS, MDS, PhD; Lauren Pilcher, MSPH; Margherita Fontana, DDS, PhD; Carlos González-Cabezas, DDS, MSD, PhD; Martha Ann Keels, DDS, PhD; Ana Karina Mascarenhas, BDS, MPH, DrPH; Marcelle Nascimento, DDS, MS, PhD; Jeffrey A. Platt, DDS, MS; Gregory J. Sabino, DDS, PhD; Rebecca Slayton, DDS, PhD; Norman Tinanoff, DDS, MS; Douglas A. Young, DDS, EdD, MBA, MS; Domenick T. Zero, DDS, MS; Sarah Pahlke, MS; Olivia Urquhart, MPH; Kelly K. O'Brien, MLIS; Alonso Carrasco-Labra, DDS, MSc, PhD

ABSTRACT

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**Types of Studies Reviewed.** The authors searched for systematic reviews comparing carious tissue removal (CTR) approaches in Ovid MEDLINE, Embase, Cochrane Database of Systematic Reviews, and Trip Medical Database. The authors also conducted a systematic search for randomized controlled trials comparing direct restorative materials in Ovid MEDLINE, Embase, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, and the World Health Organization International Clinical Trials Registry Platform. The authors used the Grading of Recommendations Assessment, Development, and Evaluation approach to assess the certainty of the evidence and formulate recommendations.

**Results.** The panel formulated 16 recommendations and good practice statements: 4 on CTR approaches specific to lesion depth and 12 on direct restorative materials specific to tooth location and surfaces involved. The panel conditionally recommended for the use of conservative CTR approaches, especially for advanced lesions. Although the panel conditionally recommended for the use of all direct restorative materials, they prioritized some materials over the use of others for certain clinical scenarios.

**Practical Implications.** The evidence suggests that more conservative CTR approaches may decrease the risk of adverse effects. All included direct restorative materials may be effective in treating moderate and advanced caries lesions on vital, nonendodontically treated primary and permanent teeth.

**Key Words.** Evidence-based dentistry; clinical practice guideline; direct restorative materials; caries; general dentistry; pediatric dentistry; American Dental Association.

JADA 2023:154(7):551-566
https://doi.org/10.1016/j.adaj.2023.04.011

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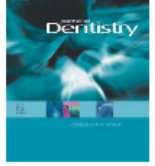


# Chemical exchange between glass-ionomer restorations and residual carious dentine in permanent molars: An in vivo study

*Hien C. Ngo*[a,*], *Graham Mount*[a], *John Mc Intyre*[a], *J. Tuisuva*[b], *R.J. Von Doussa*[a]

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ARTICLE INFO

*Article history:*
Received 6 December 2004
Accepted 18 December 2004

*Keywords:*
Glass-ionomer
Dentine remineralization
Clinical trial

ABSTRACT

**Objective:** To evaluate the remineralization of carious dentine following the restoration of an extensive lesion in a permanent molar with a high strength glass-ionomer cement (GIC).
**Materials and methods:** Thirteen first permanent molars, which were scheduled for extraction because of the presence of extensive caries lesions, were selected for this study. They were first restored, according to the ART technique, using encapsulated Fuji $IX_{GP}$, which contains a strontium glass rather than the traditional calcium glass. The cavities were prepared with a clean enamel margin and minimal removal of the carious dentine around the walls. After a period of 1–3 months they were harvested and subsequently sectioned and examined using an electron probe microanalysis (EPMA) and scanning electron microscopy (SEM).
**Results:** EPMA demonstrated that both fluorine and strontium ions had penetrated deep into the underlying demineralized dentine. The only possible source of these ions was the GIC restoration.
**Conclusion:** The pattern of penetration of the fluorine and strontium ions into the dentine was consistent with a remineralization process.



## 1. Introduction

Since the time of Dr. G.V. Black the profession has been taught to completely remove softened and discoloured dentine to eliminate infected tissue and create a hard foundation to support a proposed restoration. The suggested routine has been to remove all demineralized dentine, using aggressive hand instrumentation or a round bur, until sound, normal dentine formed the entire pulpal floor. The objective was to ensure the elimination of all remaining microorganisms thus eliminating a possible recurrence of caries. However, Lager et al. showed that this is not always successful and some microorganisms may remain even after all softened dentine has been removed and the cavity treated with sodium hypochlorite.[1] The main risk with this traditional approach is the possible accidental exposure of the pulp, particularly in young patients, where the rate of pulp exposure following excavation of large carious lesions in permanent molars has been rated at 40%.[2]

A step-wise excavation technique was introduced by Bodecker[3] designed to decrease the risk of mechanical pulp exposure. Bodecker recommended partial removal of the soft demineralized dentine on the cavity floor followed by immediate restoration with a temporary material such as zinc oxide/eugenol. The transitional material was expected to remain for a brief period of weeks and then replaced with

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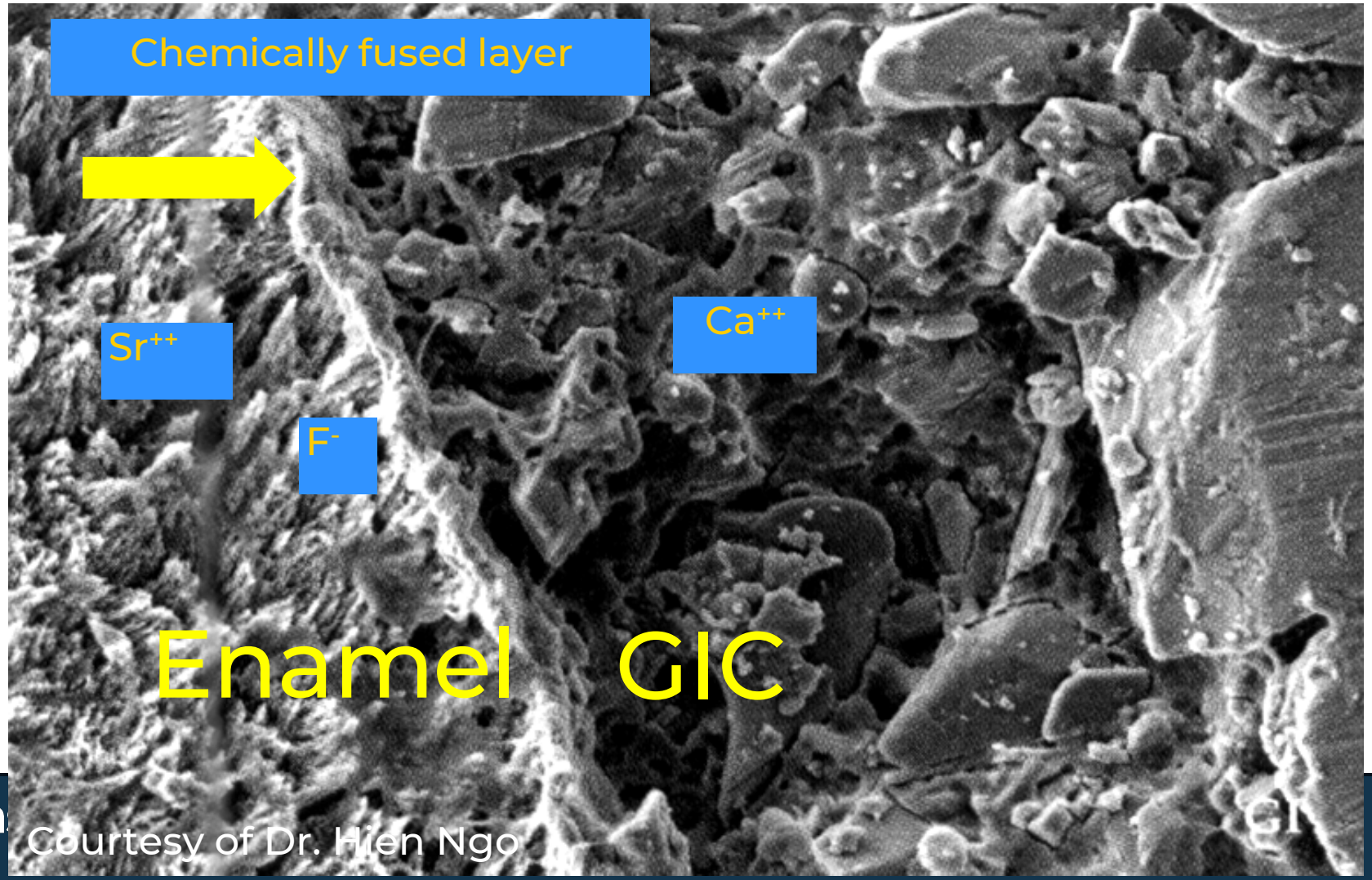
0300-5712/$ – see front matter © 2006 Published by Elsevier Ltd.
doi:10.1016/j.jdent.2005.12.012

# Internal Remineralization

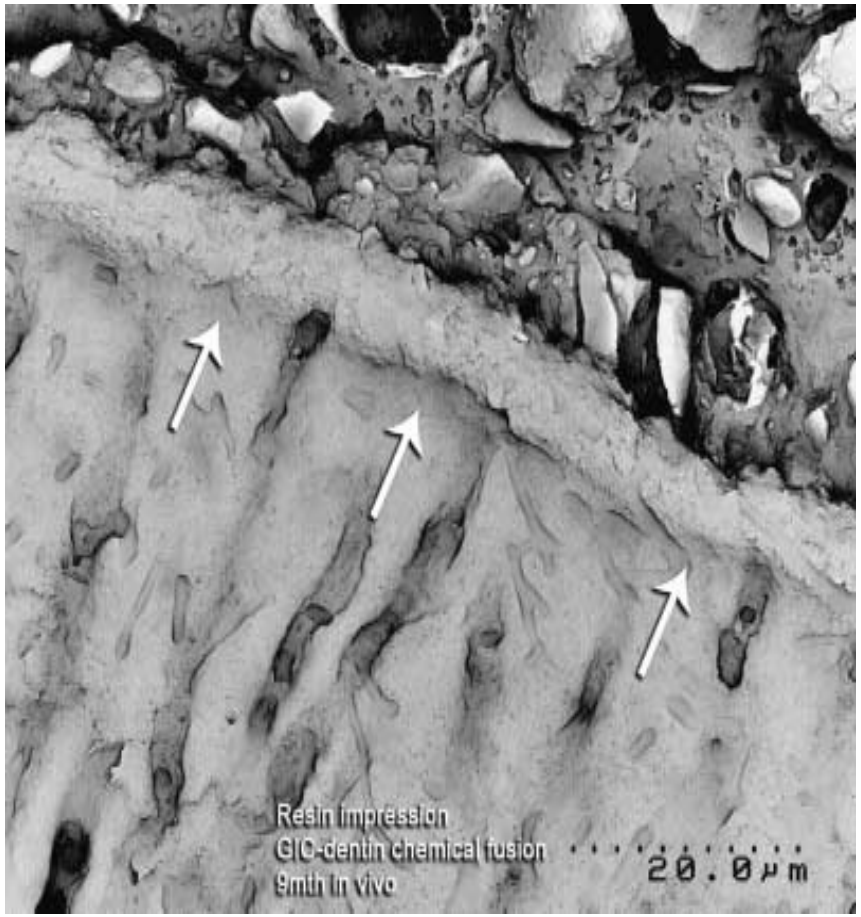
"Electron probe microanalysis demonstrated that both fluorine and strontium ions had penetrated deep into underlying demineralized dentin. The pattern was consistent with remineralization. The only source of these ions was the glass ionomer restoration."

# Studies by Dr. Hien Ngo
# The “Chemically Fused Layer on Enamel”

## Internal Remineralization is Acid Resistant



# Chemically Fused Zone on Dentin




SEM technique for examining the glass–ionomer cement chemical fusion zone. Milicich G. Journal of Microscopy, Vol. 217, Pt 1 January 2005, pp. 44–48

Ionic constituents from both the GIC and the underlying dentin

# Do glass ionomer cements prevent caries lesions in margins of restorations in primary teeth?

## A systematic review and meta-analysis

Daniela Prócida Raggio, DDS, MSc, PhD; Tamara Kerber Tedesco, DDS, MSc, PhD; Ana Flávia Bissoto Calvo, DDS, MSc, PhD; Mariana Minatel Braga, DDS, MSc, PhD

New caries lesions in restoration margins are a frequent concern in dentistry, especially when there is no patient compliance. Thus, this problem has been seen as the main reason for failure and replacement of restorations in primary teeth,[1] with reports showing approximately 8.0% of restoration failures even within 5 years when these caries lesions are filled with polyacid-modified resin composite (PMRC), resin composite (RC), or amalgam.[2,3]

These restorative materials, in the same way as glass ionomer cements (GICs), have shown satisfactory performance in restorations of primary teeth.[4-6] However, conventional GIC—a low-viscosity restorative material—has a shorter longevity than do the other materials.[4] Results of a previous systematic review showed that there is a higher number of failed restorations with the atraumatic restorative treatment (ART) technique when it was performed with conventional GIC, whereas the longevity of ART restorations performed with high-viscosity GIC (HVGIC) is higher.[6] HVGIC is also a material for which setting is an acid-based reaction; however, HVGIC performed similarly to the other materials in both occlusal and occlusoproximal restorations.[7,8] Conversely, resin-modified GIC (RMGIC)—a GIC with addition of hydroxyethylmethacrylate, similar to HVGIC—also can be considered an alternative to restore dentinal caries lesions.[5]

Fluoride interferes with the processes of demineralized and remineralization of caries lesions, and some authors suggest that the fluoride released from GICs is capable of preventing caries.[9,10] Investigators in previous




### ABSTRACT

**Background.** Fluoride released from glass ionomer cements (GICs) is capable of preventing caries lesions. However, the preventive effect in margins of occlusal and occlusoproximal restorations have not been proved. The aim of this study was to evaluate the ability of GIC to prevent caries lesions in margins of occlusal and occlusoproximal restorations in primary teeth compared with that of other restorative materials.

**Types of Studies Reviewed.** The authors conducted a literature search in PubMed and MEDLINE to verify the clinical trials available on the outcome of caries lesions. The inclusion criteria were that the subject related to the scope of this systematic review, the study had a follow-up, and the study was not performed in specific groups. The authors performed all meta-analyses by considering the secondary caries rates for the restorations in clinical trials.

**Results.** The search strategy identified 450 potentially relevant studies, and the authors included 8 of them in the review. The main reasons for exclusion were that the studies were not related to the scope of this review or were not longitudinal trials. The secondary caries rate of the occlusal restorations was not different among the restorative materials (odds ratio, 1.2; 95% confidence interval, 0.5-3.1). For occlusoproximal analysis, GIC was associated significantly with better ability to prevent caries lesions (odds ratio, 1.7; 95% confidence interval, 1.2-2.5).

**Conclusions and Practical Implications.** Because new caries lesions in the margins of restorations are the main reason for failure and replacement of restorations in primary teeth, it is important to know whether there is a benefit in using GICs in both occlusal and occlusoproximal cavities.


**Key Words.** Dental caries; glass ionomer cements; fluoride.

JADA 2015:■(■):■-■

http://dx.doi.org/10.1016/j.adaj.2015.09.016

GIC better prevention at margins

# Selective Caries Removal? What is the evidence?

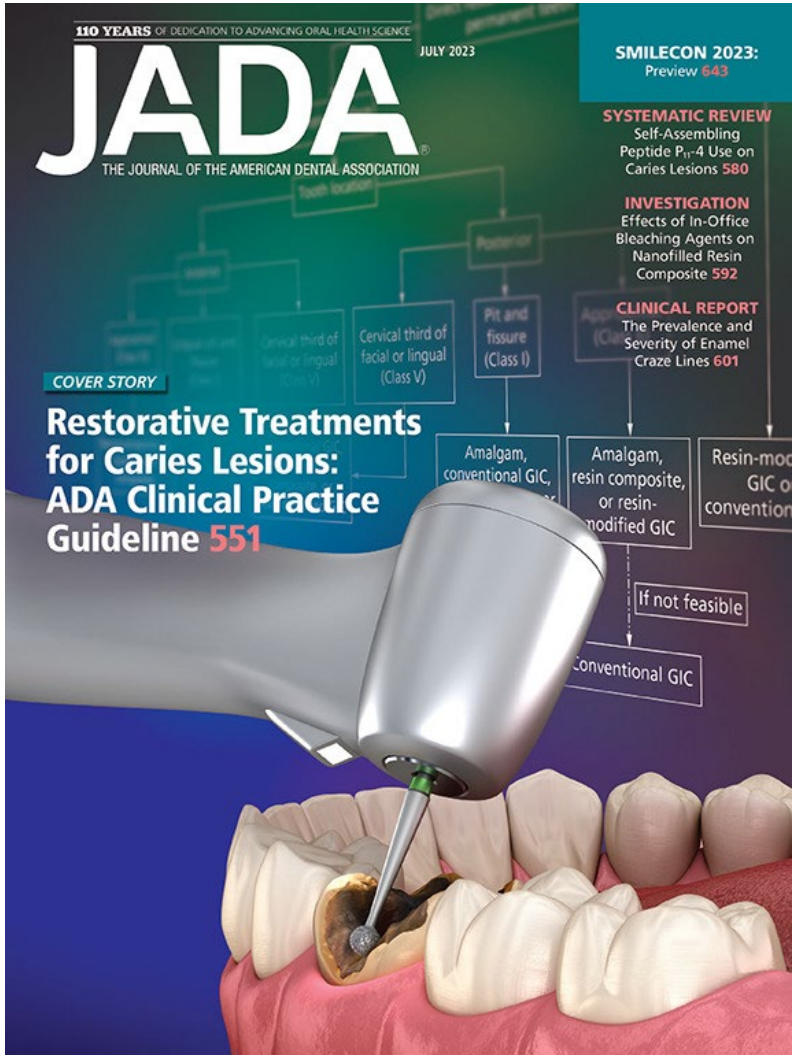
# Evidence for Selective Caries Removal

Critical Summaries

Meta Analysis

# Selective Caries Removal

July 2023




"More conservative carious tissue removal may decrease adverse effects"

Clinical Practice Guideline

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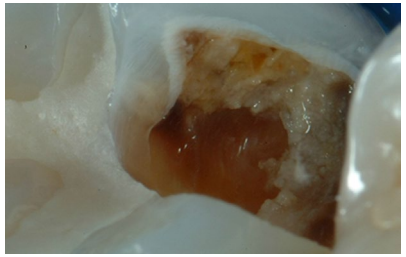
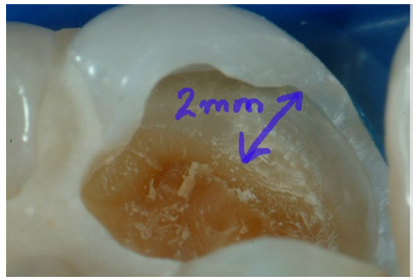
JADA 2023:154(7):551-566
https://doi.org/10.1016/j.adaj.2023.04.011

# Selective Caries Removal
# Know when to stop!

- **Clean the perimeter** of the lesion using the 2mm rule to **avoid pulp exposure**
- Rationale: demineralization precedes bacterial penetration of dentinal tubules, so removing most of the **soft & wet** dentin will remove most of the infected tissue
- Glass ionomer will **seal out nutrient sources** from entering. Thus no acid or deminerealization will occur

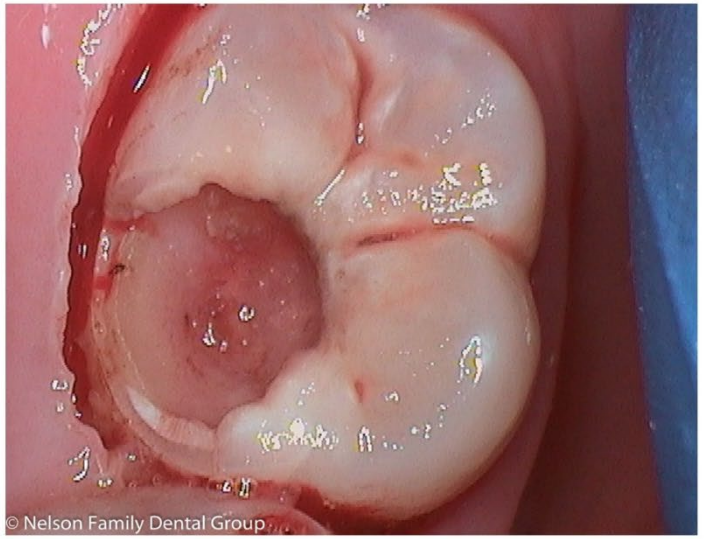
Courtesy of Dr. Hien Ngo

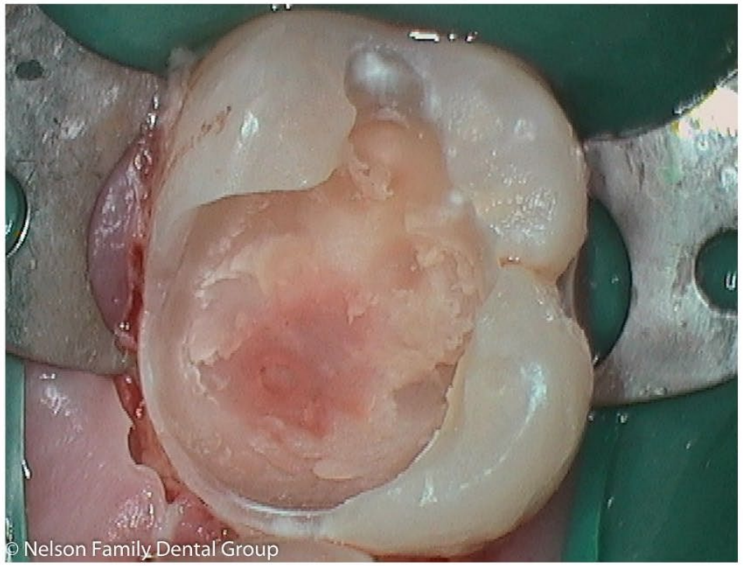





Infected = Wet & Soft

Affected = Dry & Soft



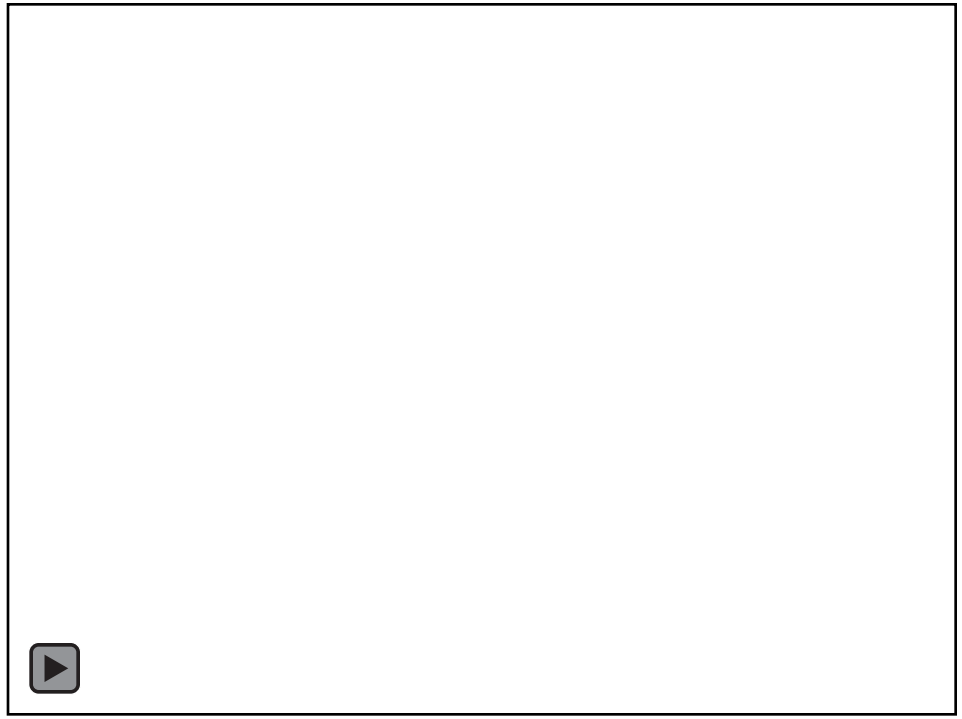
Glass Ionomer – Equia Forte
Deepest Excavation with Smooth Side of an Explorer
January 2019



Mike Nelson, DDS
www.NelsonFamily.Dental

# Can GIC Really be used for Esthetics and Chewing?

# GI Compression Test

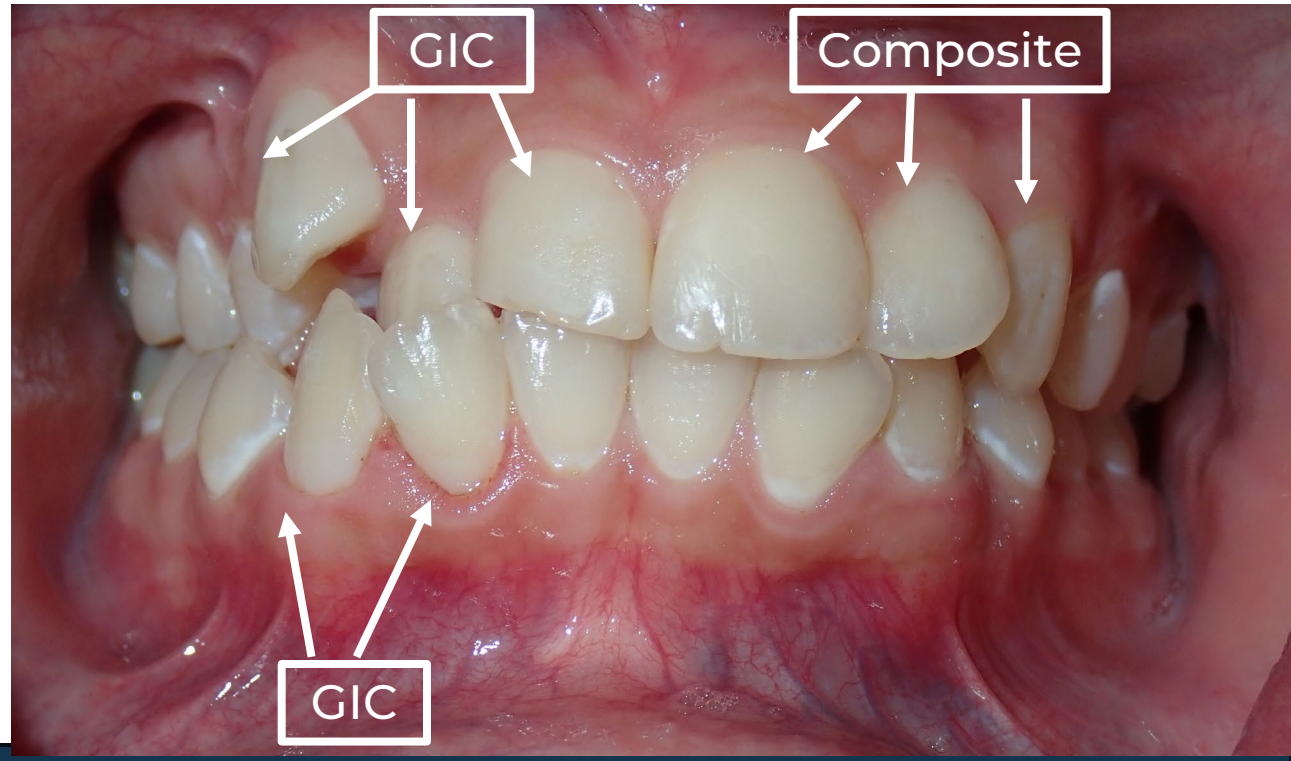


Courtesy of Douglas Young and Jordan A. Jew

# Would you choose GIC or Composite for esthetics and longevity?

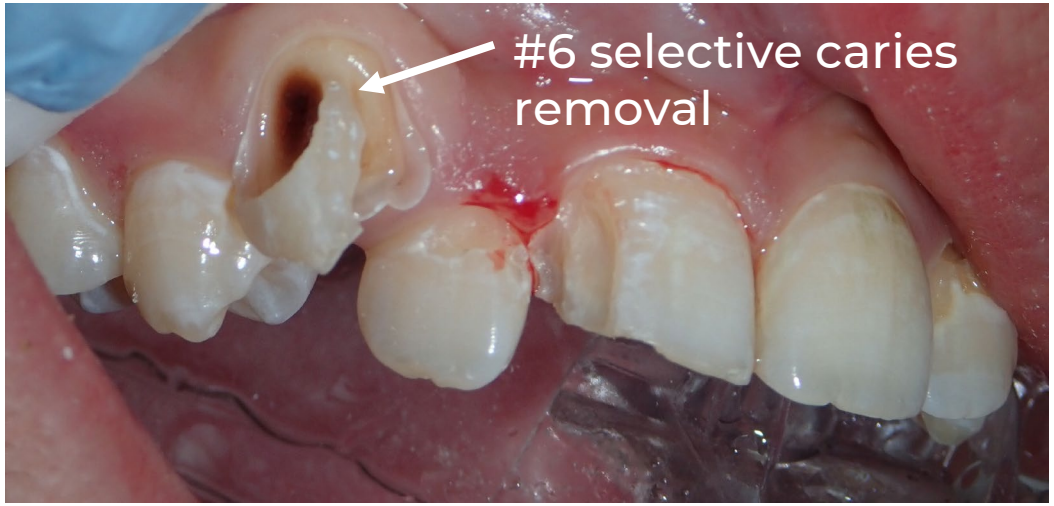
Before

After



## Pre-op

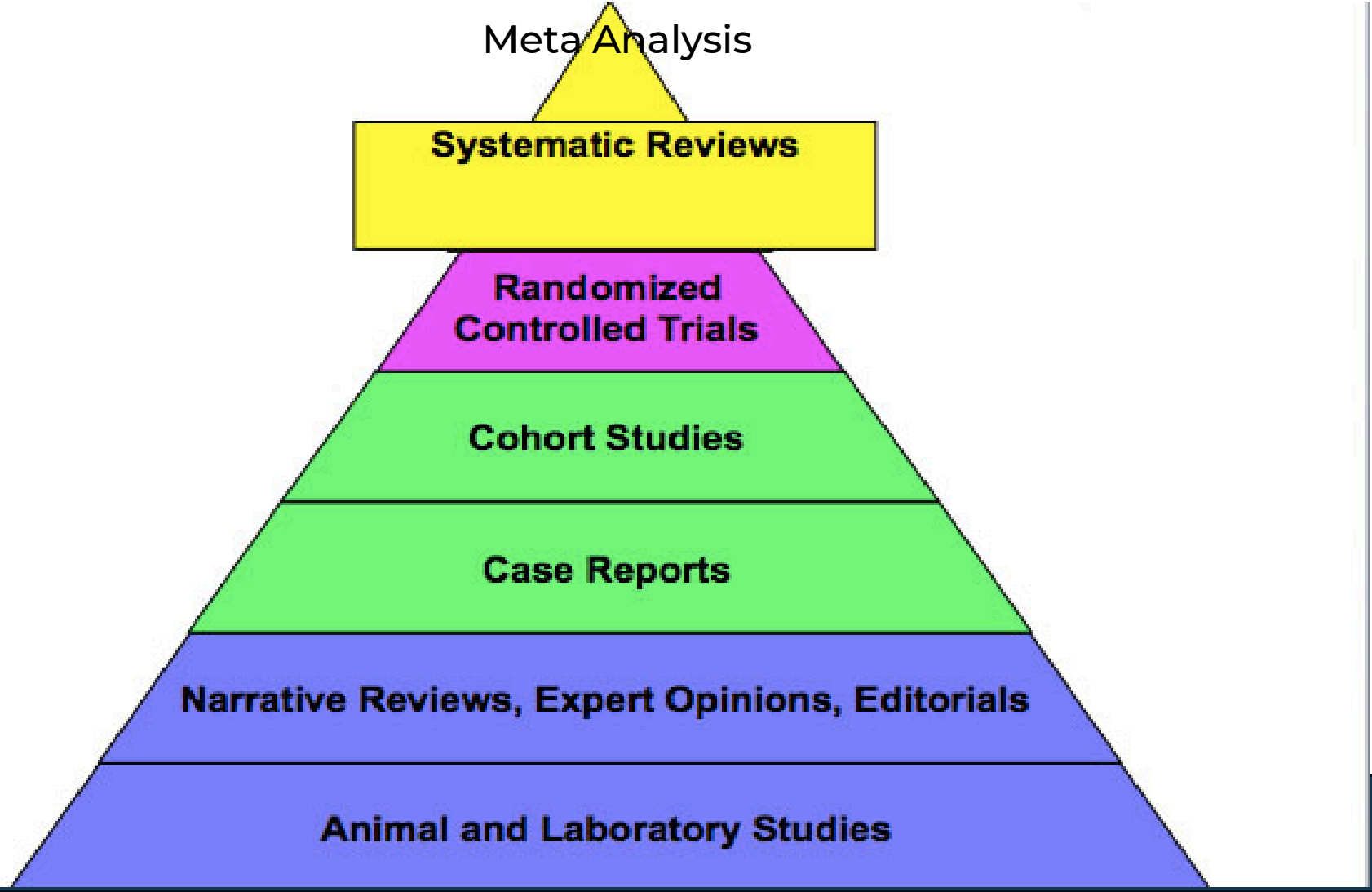
## Intra-op



# Evidence for Silver Diamine Fluoride

ADA EBD Guidelines

Critical Summaries



Oct
2018

Cover Story

# Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions

## A report from the American Dental Association

Rebecca L. Slayton, DDS, PhD; Olivia Urquhart, MPH; Marcelo W.B. Araujo, DDS, MS, PhD; Margherita Fontana, DDS, PhD; Sandra Guzmán-Armstrong, DDS, MS; Marcelle M. Nascimento, DDS, MS, PhD; Brian B. Nový, DDS; Norman Tinanoff, DDS, MS; Robert J. Weyant, DMD, DrPH; Mark S. Wolff, DDS, PhD; Douglas A. Young, DDS, EdD, MS, MBA; Domenick T. Zero, DDS, MS; Malavika P. Tampi, MPH; Lauren Pilcher, MSPH; Laura Banfield, MLIS, MHSc; Alonso Carrasco-Labra, DDS, MSc

ABSTRACT

**Background.** An expert panel convened by the American Dental Association Council on Scientific Affairs and the Center for Evidence-Based Dentistry conducted a systematic review and formulated evidence-based clinical recommendations for the arrest or reversal of noncavitated and cavitated dental caries using nonrestorative treatments in children and adults.

**Types of Studies Reviewed.** The authors conducted a systematic search of the literature in MEDLINE and Embase via Ovid, Cochrane CENTRAL, and Cochrane database of systematic reviews to identify randomized controlled trials reporting on nonrestorative treatments for noncavitated and cavitated carious lesions. The authors used the Grading of Recommendations Assessment, Development and Evaluation approach to assess the certainty in the evidence and move from the evidence to the decisions.

**Results.** The expert panel formulated 11 clinical recommendations, each specific to lesion type, tooth surface, and dentition. Of the most effective interventions, the panel provided recommendations for the use of 38% silver diamine fluoride, sealants, 5% sodium fluoride varnish, 1.23% acidulated phosphate fluoride gel, and 5,000 parts per million fluoride (1.1% sodium fluoride) toothpaste or gel, among others. The panel also provided a recommendation against the use of 10% casein phosphopeptide—amorphous calcium phosphate.

**Conclusions and Practical Implications.** Although the recommended interventions are often used for caries prevention, or in conjunction with restorative treatment options, these approaches have shown to be effective in arresting or reversing carious lesions. Clinicians are encouraged to prioritize use of these interventions based on effectiveness, safety, and feasibility.


A
R
T
Atraumatic
Restorative
Technique

# Clean Perimeter with bur or spoon

Don’t use retraction cord with SDF as it will stain the gingiva

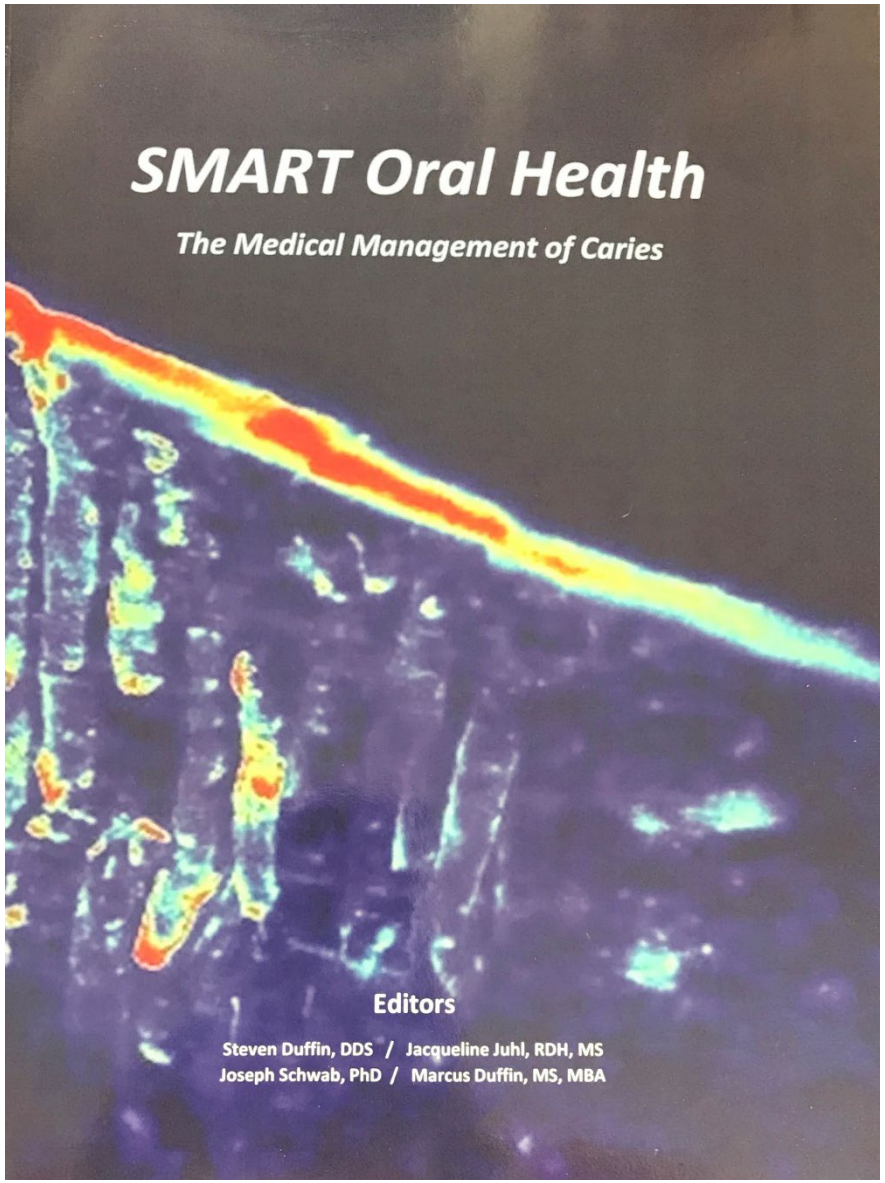
Courtesy of Dr, Vu Le

# Really SMART

Before

During

After




# SMART Textbook (Amazon)

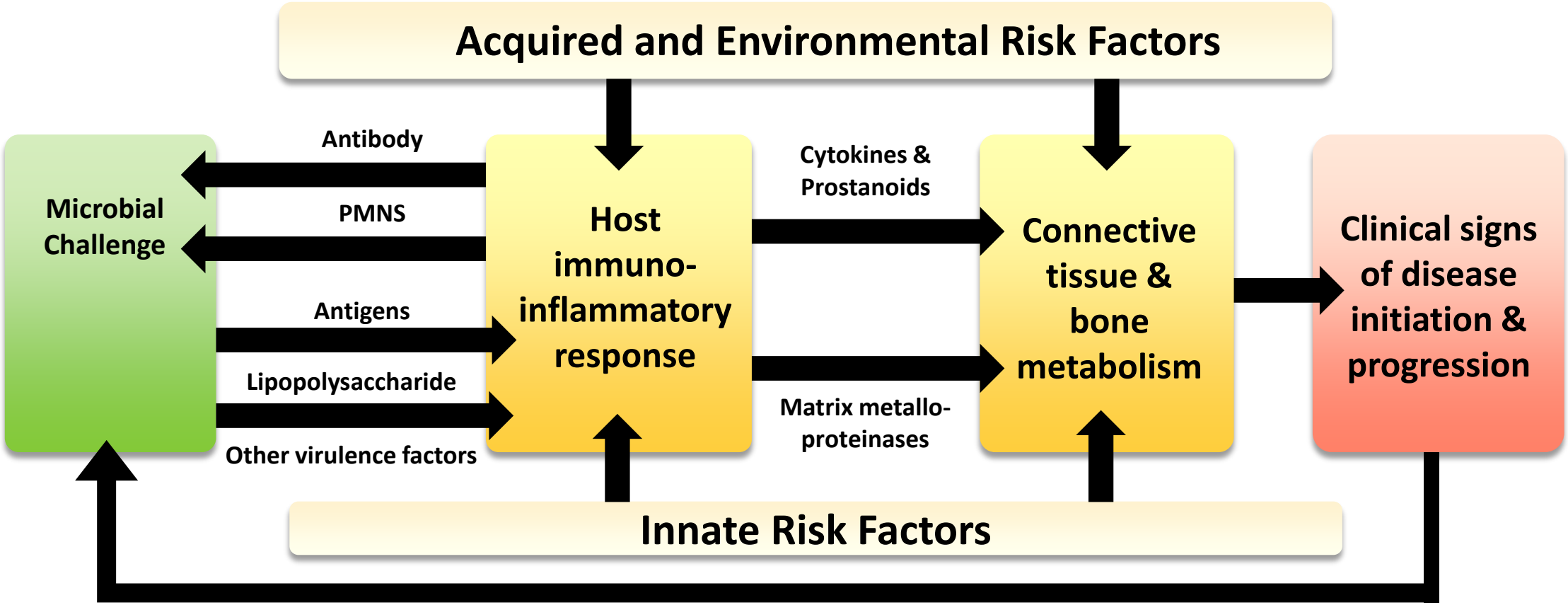
PDF now available for free in English and Spanish from the following website

www.smartoralhealth.com

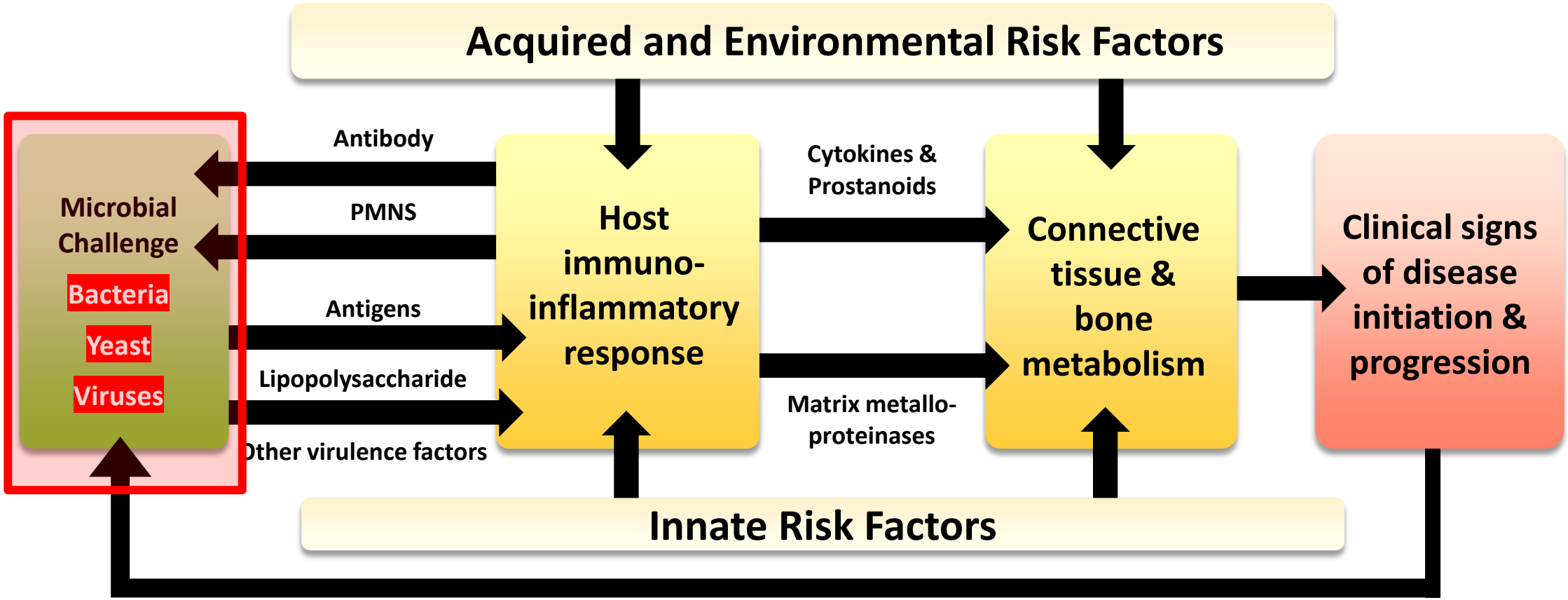
THANK YOU!

# Microbiome Metrics in Caries Management

Doug Thompson, DDS




*Modified from Kornman KS: Clin Infect Dis 28: 520, 1999*

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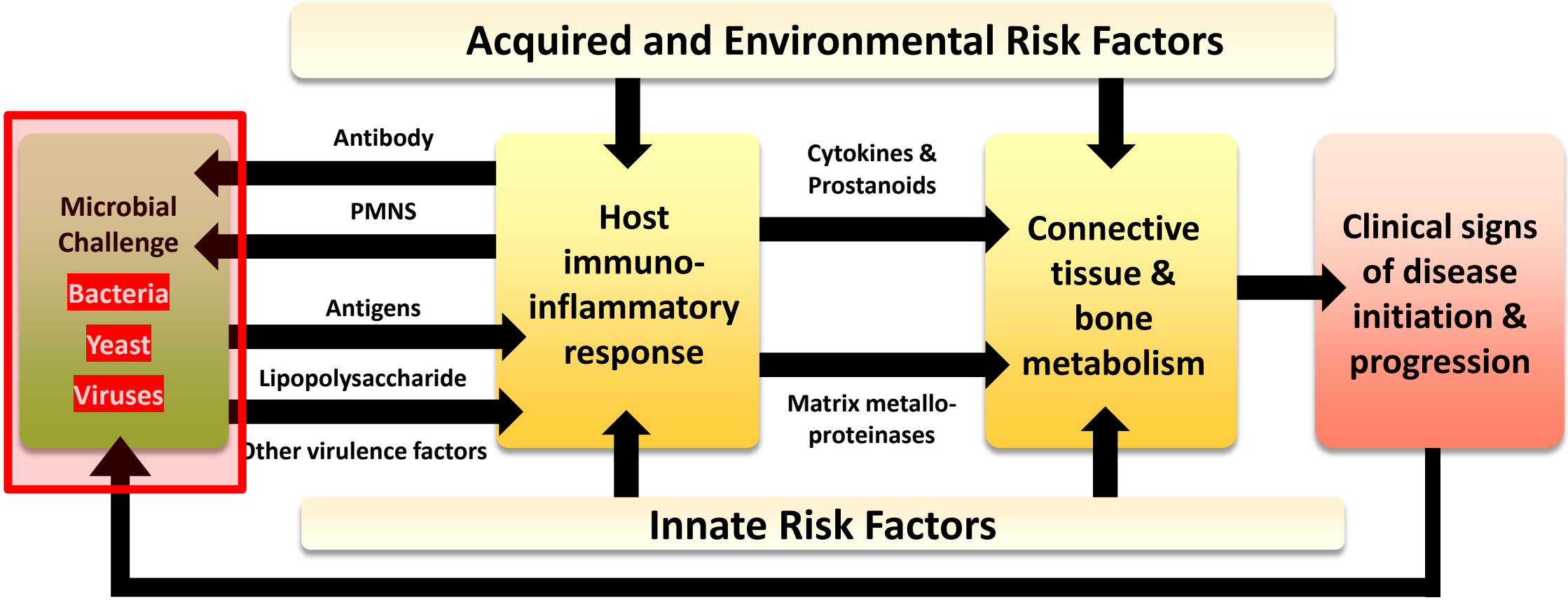



*Modified from Kornman KS: Clin Infect Dis 28: 520, 1999*

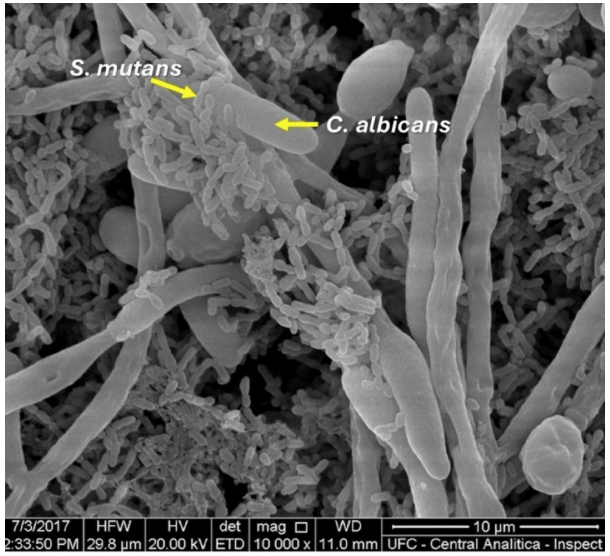
*We can treat periodontal disease by shifting or modifying biofilm dysbiosis with long-term success.*

**Is a combined approach of biofilm modulation and restoration more effective for caries treatment than restoration alone?**

# Etiology: The Microbiome of Caries

- **Highly acidic** and **aciduric** species associated with caries include ***Streptococcus mutans***, ***Lactobacillus***, ***Actinomyces***, ***Bifidobacterium***, **and *Scardovia*** species.

- Excess acid production leads to a **dysbiotic shift** in the biofilm composition  demineralization of tooth structure  cavities.




***Scanning electron micrograph showing co-adhesion of Streptococcus mutans with Candida albicans***
*Image acquired by Wanessa Fernandes Matias Regis*

- The role of bacteria in the etiology of dental caries is long established, while the **role of fungi has only recently gained more attention.**

- There was a **higher ratio of fungi to bacteria in dentin-involved lesions compared to less severe lesions**
  - *Candida albicans*, *C. dubliniensis*, and *C. tropicalis*.

- *Candida albicans* and *Streptococcus mutans* frequently coexist within dental biofilms and **enhance each other's pathogenic potential.**

- These mixed-species biofilms exhibit **increased acid production** and **greater resistance to antimicrobial agents** compared to single-species biofilms.

# Systemic Implications

- *Streptococcus mutans* is the **primary pathogenic bacterium** associated with dental caries.
- Key virulence traits include **acid production, acid tolerance, and strong adhesion properties**, which drive demineralization and cavity formation.
- These same traits enable *S. mutans* to:
  - **Evade host immune defenses** in body fluids
  - **Adhere to non-dental tissues**, such as vascular endothelium
  - **Trigger inflammatory responses** that can damage host organs

- Proposed dissemination pathway: **entry into the bloodstream → adhesion to tissues → activation of pro-inflammatory mechanisms → localization in target organs**.
- Systemic conditions with emerging links to *S. mutans* include: **cerebral hemorrhage, inflammatory bowel disease, tumors, and infective endocarditis**.

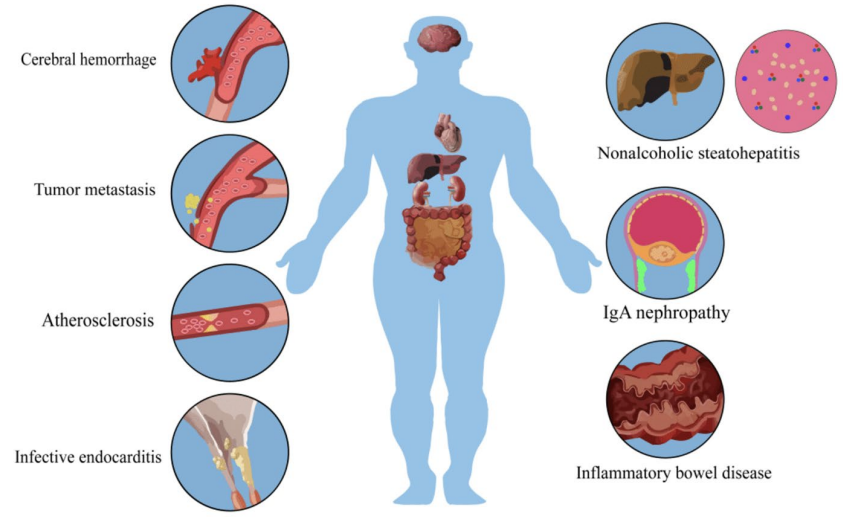


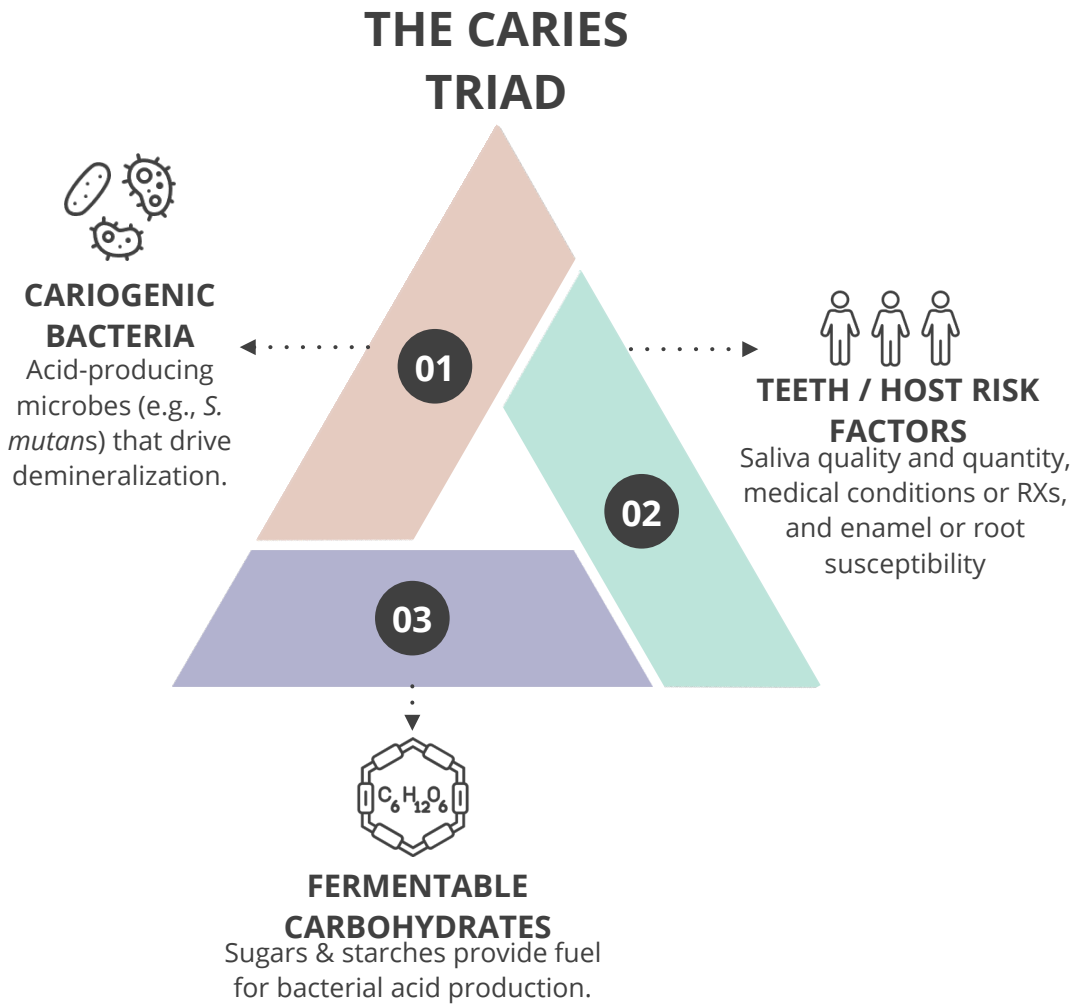

FIGURE 1
Multi-organ damage caused by *S. mutans* in systemic diseases.

# Management Models: Is It Time To Evolve?

- **Traditional management** is based on the **surgical model**: **cutting and restoring the tooth to remove caries lesions.**
  - This restorative cycle can be ***short-sighted*** by not addressing full etiological source of caries.

- **The medical model of caries management is more conservative, preventive, and patient-centered.**

- The medical model involves four main principles
  1. **Control of bacterial infection**
  2. **Reduction of risk levels**
  3. **Remineralization of teeth**
  4. **Long-term follow-up**



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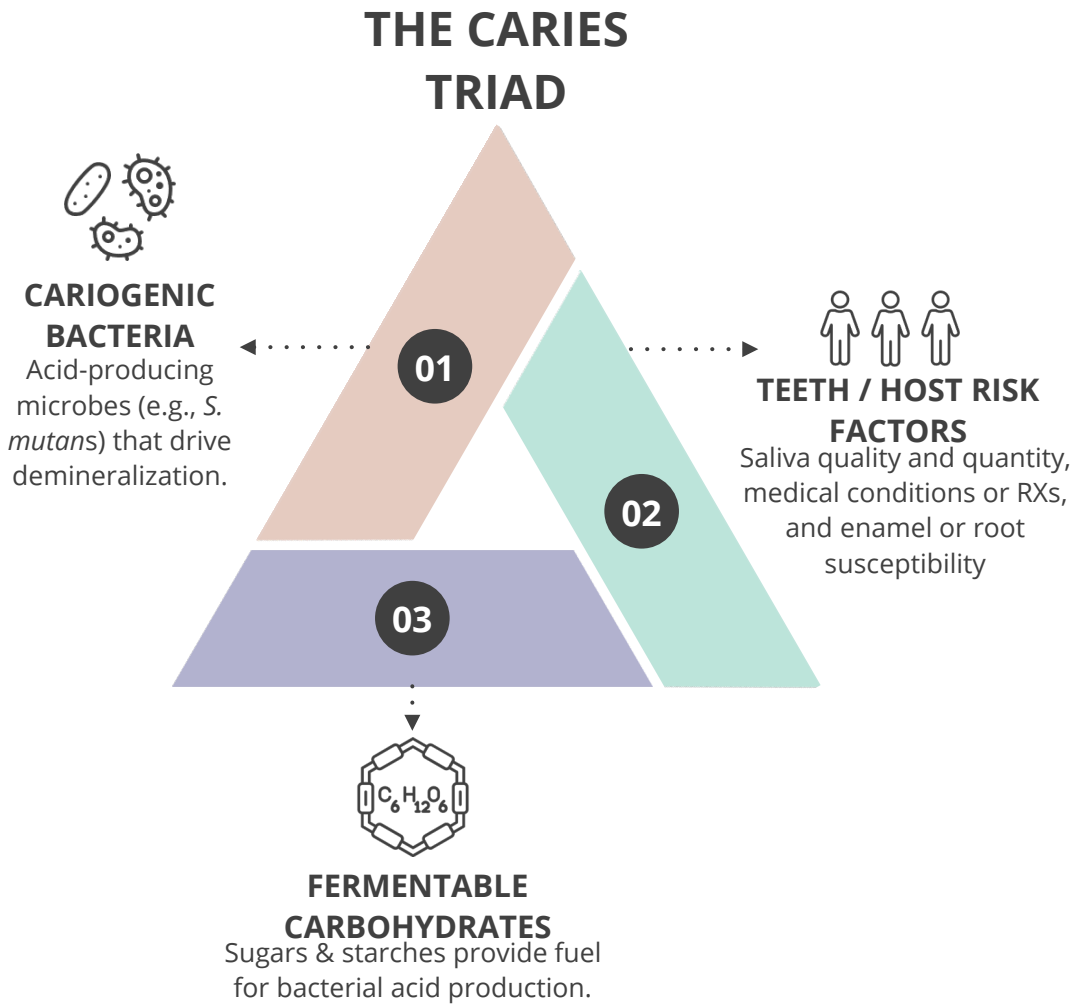
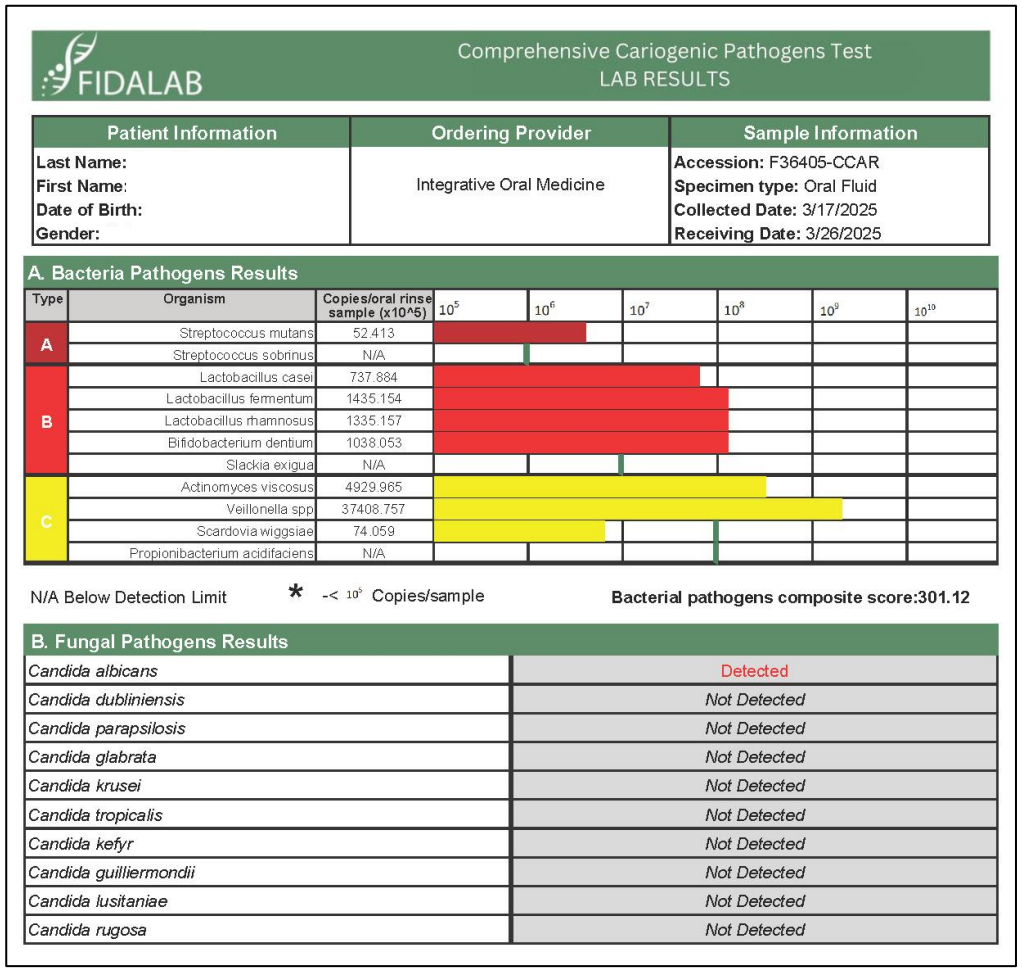


# Biofilm Assessment



FIDALAB

Comprehensive Cariogenic Pathogens Test
LAB RESULTS

| Patient Information | Ordering Provider | Sample Information |
|---|---|---|
| **Last Name:**<br>**First Name:**<br>**Date of Birth:**<br>**Gender:** | Integrative Oral Medicine | **Accession:** F36405-CCAR<br>**Specimen type:** Oral Fluid<br>**Collected Date:** 3/17/2025<br>**Receiving Date:** 3/26/2025 |

**A. Bacteria Pathogens Results**

| Type | Organism | Copies/oral rinse sample (x10^5) |
|---|---|---|
| A | Streptococcus mutans | 52.413 |
| | Streptococcus sobrinus | N/A |
| B | Lactobacillus casei | 737.884 |
| | Lactobacillus fermentum | 1435.154 |
| | Lactobacillus rhamnosus | 1335.157 |
| | Bifidobacterium dentium | 1038.053 |
| | Slackia exigua | N/A |
| C | Actinomyces viscosus | 4929.965 |
| | Veillonella spp | 37408.757 |
| | Scardovia wiggsiae | 74.059 |
| | Propionibacterium acidifaciens | N/A |

N/A Below Detection Limit  * -< $10^5$ Copies/sample  **Bacterial pathogens composite score:301.12**

**B. Fungal Pathogens Results**

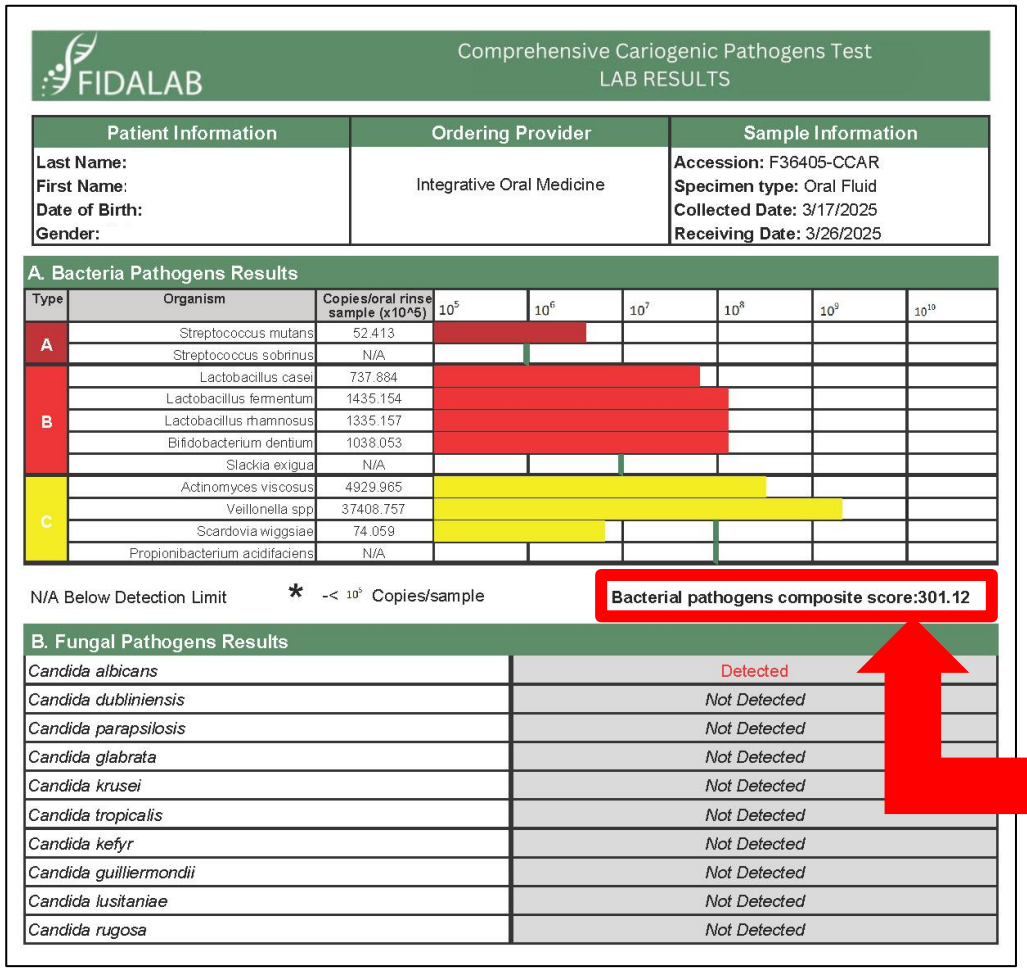
| | |
|---|---|
| *Candida albicans* | Detected |
| *Candida dubliniensis* | *Not Detected* |
| *Candida parapsilosis* | *Not Detected* |
| *Candida glabrata* | *Not Detected* |
| *Candida krusei* | *Not Detected* |
| *Candida tropicalis* | *Not Detected* |
| *Candida kefyr* | *Not Detected* |
| *Candida guilliermondii* | *Not Detected* |
| *Candida lusitaniae* | *Not Detected* |
| *Candida rugosa* | *Not Detected* |

## FidaLab Comprehensive Caries

***CURRENTLY THE MOST COMPREHENSIVE qPCR SALIVARY DIAGNOSTIC TEST AVAILABLE.***

- Tests for *S. mutans*, *S. sobrinus*, and nine more cariogenic bacteria  Provides logarithmic amount along with bacterial pathogen composite score.
- Tests for 10 *Candida* spp  Provides Detected or *Not Detected* metrics
- CDT code can be utilized for billing purposes: **D0417 *Collect & prep saliva for lab diagnosis***

# Biofilm Assessment



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**Composite Score Scale**

**<1 = Low Caries Risk**

**1 – 10 = Moderate Caries Risk**

**>10 = High Caries Risk**

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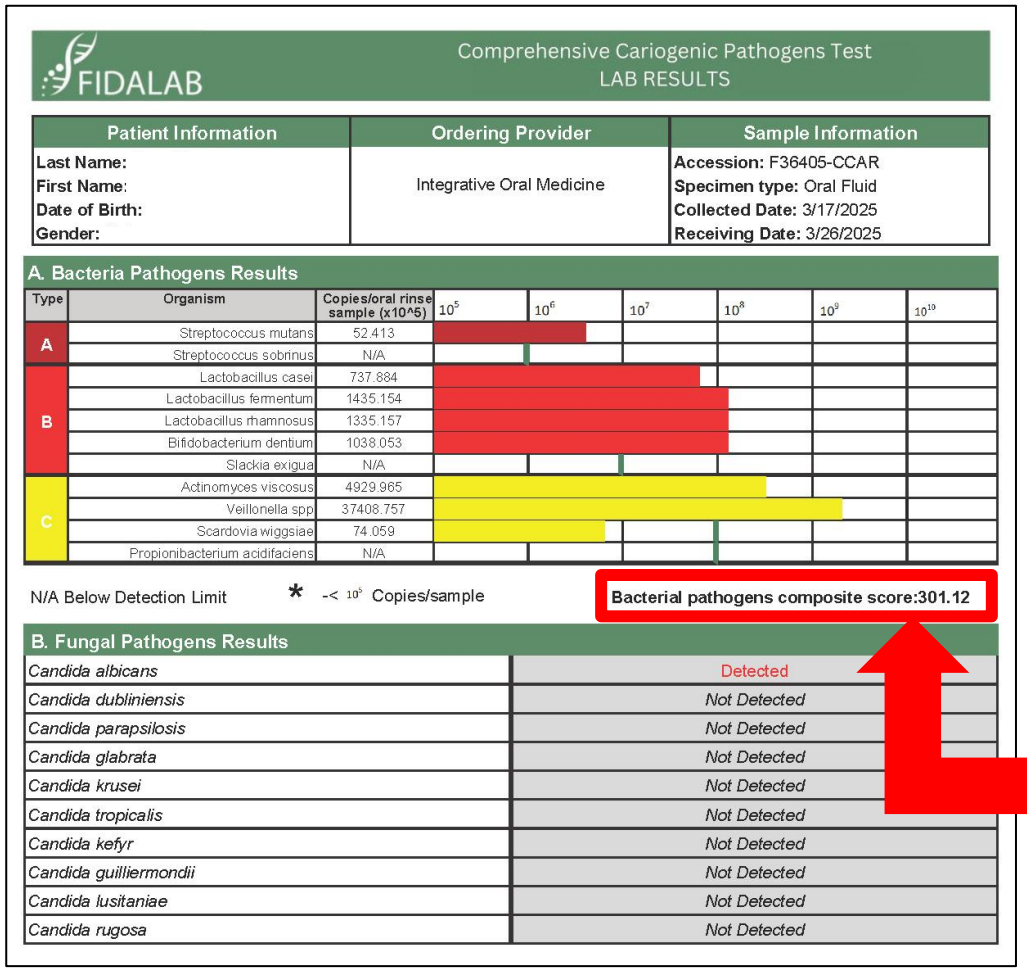

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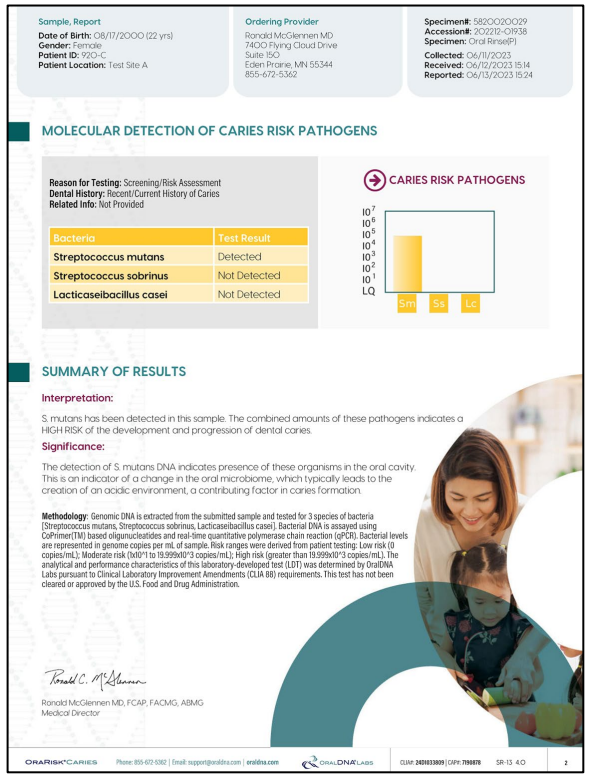
**Composite Score Scale**
**<1 = Low Caries Risk**
**1 – 10 = Moderate Caries Risk**
**>10 = High Caries Risk**

***What other qPCR assays are available for detecting cariogenic bacteria?***

# Biofilm Assessment



Sample, Report
Date of Birth: 08/17/2000 (22 yrs)
Gender: Female
Patient ID: 920-C
Patient Location: Test Site A

Ordering Provider
Ronald McGlennen MD
7400 Flying Cloud Drive
Suite 150
Eden Prairie, MN 55344
855-672-5362

Specimen#: 582002002 9
Accession#: 202212-01938
Specimen: Oral Rinse(P)
Collected: 06/11/2023
Received: 06/12/2023 15:14
Reported: 06/13/2023 15:24

MOLECULAR DETECTION OF CARIES RISK PATHOGENS

Reason for Testing: Screening/Risk Assessment
Dental History: Recent/Current History of Caries
Related Info: Not Provided

| Bacteria | Test Result |
|---|---|
| Streptococcus mutans | Detected |
| Streptococcus sobrinus | Not Detected |
| Lacticaseibacillus casei | Not Detected |

CARIES RISK PATHOGENS

SUMMARY OF RESULTS

Interpretation:

S. mutans has been detected in this sample. The combined amounts of these pathogens indicates a HIGH RISK of the development and progression of dental caries.

Significance:

The detection of S. mutans DNA indicates presence of these organisms in the oral cavity. This is an indicator of a change in the oral microbiome, which typically leads to the creation of an acidic environment, a contributing factor in caries formation.

Methodology: Genomic DNA is extracted from the submitted sample and tested for 3 species of bacteria [Streptococcus mutans, Streptococcus sobrinus, Lacticaseibacillus casei]. Bacterial DNA is assayed using CoPrimer(TM) based oligunucleatides and real-time quantitative polymerase chain reaction (qPCR). Bacterial levels are represented in genome copies per mL of sample. Risk ranges were derived from patient testing: Low risk (0 copies/mL); Moderate risk (1x10^1 to 19.999x10^3 copies/mL); High risk (greater than 19.999x10^3 copies/mL). The analytical and performance characteristics of this laboratory-developed test (LDT) was determined by OralDNA Labs pursuant to Clinical Laboratory Improvement Amendments (CLIA 88) requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

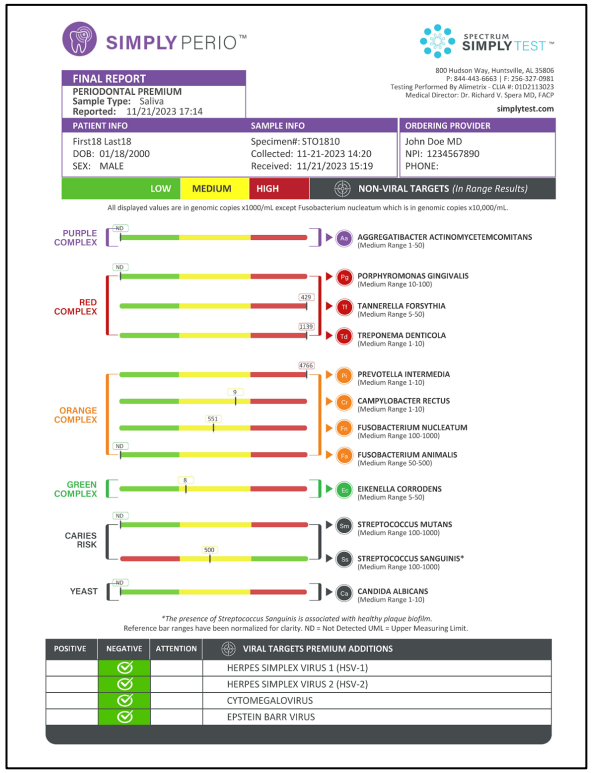
Ronald C. McGlennen

Ronald McGlennen MD, FCAP, FACMG, ABMG
Medical Director

ORARISK CARIES | OralDNA Labs

## OralDNA OraRisk Caries

- Tests for *S. mutans, S. sobrinus,* and *L. casei* Provides *Detected* and *Not Detected* metrics along with logarithmic value



SIMPLY PERIO™

SPECTRUM SIMPLY TEST™

800 Hudson Way, Huntsville, AL 35806
P: 844-443-6663 | F: 256-327-0981
Testing Performed By Alimetrix - CLIA #: 01D2113023
Medical Director: Dr. Richard V. Spera MD, FACP
simplytest.com

FINAL REPORT
PERIODONTAL PREMIUM
Sample Type: Saliva
Reported: 11/21/2023 17:14

| PATIENT INFO | SAMPLE INFO | ORDERING PROVIDER |
|---|---|---|
| First18 Last18 | Specimen#: STO1810 | John Doe MD |
| DOB: 01/18/2000 | Collected: 11-21-2023 14:20 | NPI: 1234567890 |
| SEX: MALE | Received: 11/21/2023 15:19 | PHONE: |

LOW | MEDIUM | HIGH | NON-VIRAL TARGETS (In Range Results)

All displayed values are in genomic copies x1000/mL except Fusobacterium nucleatum which is in genomic copies x10,000/mL.

PURPLE COMPLEX
- AGGREGATIBACTER ACTINOMYCETEMCOMITANS (Medium Range 1-50)

RED COMPLEX
- PORPHYROMONAS GINGIVALIS (Medium Range 10-100)
- TANNERELLA FORSYTHIA (Medium Range 5-50)
- TREPONEMA DENTICOLA (Medium Range 1-10)

ORANGE COMPLEX
- PREVOTELLA INTERMEDIA (Medium Range 1-10)
- CAMPYLOBACTER RECTUS (Medium Range 1-10)
- FUSOBACTERIUM NUCLEATUM (Medium Range 100-1000)
- FUSOBACTERIUM ANIMALIS (Medium Range 50-500)

GREEN COMPLEX
- EIKENELLA CORRODENS (Medium Range 5-50)

CARIES RISK
- STREPTOCOCCUS MUTANS (Medium Range 100-1000)
- STREPTOCOCCUS SANGUINIS* (Medium Range 100-1000)

YEAST
- CANDIDA ALBICANS (Medium Range 1-10)

*The presence of Streptococcus Sanguinis is associated with healthy plaque biofilm.
Reference bar ranges have been normalized for clarity. ND = Not Detected UML = Upper Measuring Limit.

| POSITIVE | NEGATIVE | ATTENTION | VIRAL TARGETS PREMIUM ADDITIONS |
|---|---|---|---|
| | ✓ | | HERPES SIMPLEX VIRUS 1 (HSV-1) |
| | ✓ | | HERPES SIMPLEX VIRUS 2 (HSV-2) |
| | ✓ | | CYTOMEGALOVIRUS |
| | ✓ | | EPSTEIN BARR VIRUS |

## Spectrum Diagnostics SimplyPerio

- Tests for *S. mutans, S. sanguinis,* and *C. ablicans* Provides logarithmic value on a high, medium, and low categorical rating scale
- Also tests for nine periodontal pathogens, one pathogen associated with peri-implantitis, and four herpesviruses.

# Biofilm Assessment

## CariScreen Testing Meter

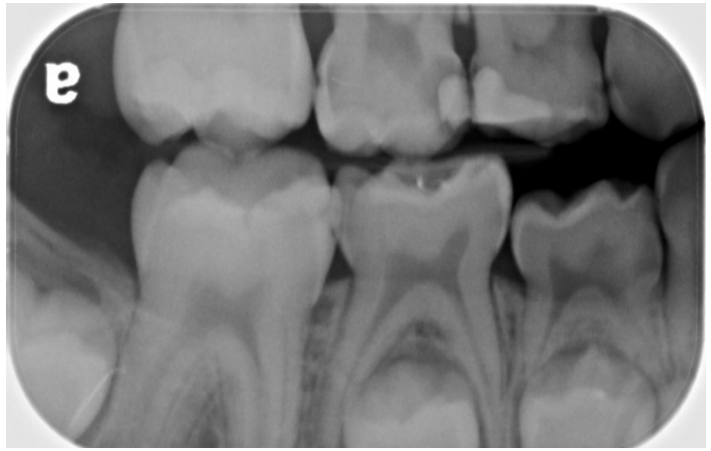
- Simple 1-minute chair-side bacterial test
- Uses ATP bioluminescence to identify oral bacterial load
- Proven to correlate with patients' risk for decay
- Gives a score between 0 - 9,999
  - < 1,500 = healthy
  - > 1,500 = decay risk

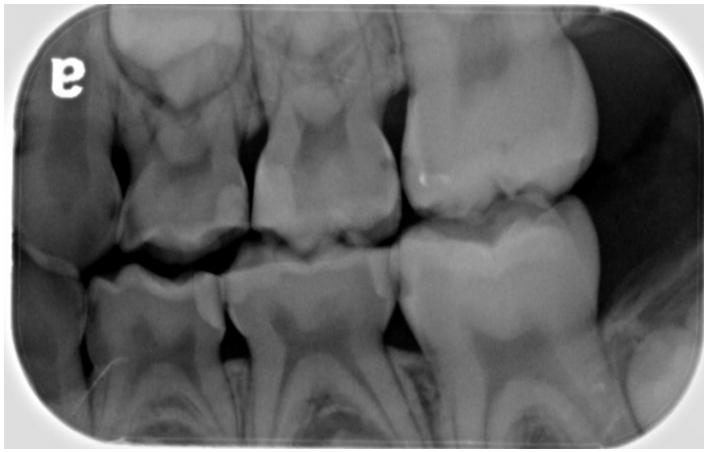

CariScreen score had a strong positive correlation r = 0.76 with total cell count, a positive correlation with MS counts r = 0.69, and a positive correlation to caries risk status r = 0.55 with high significance p = 0.000001.


## CariFree Caries Risk Assessment Form

- Risk assessment forms available for different ages
- CDT code can be utilized for billing purposes: **D0601/0602/0603 -** *Caries risk assessment and documentation with a finding of low/moderate/high risk*
- Helps assess caries risk and determine appropriate radiograph frequency

# Clinical Case - Ava

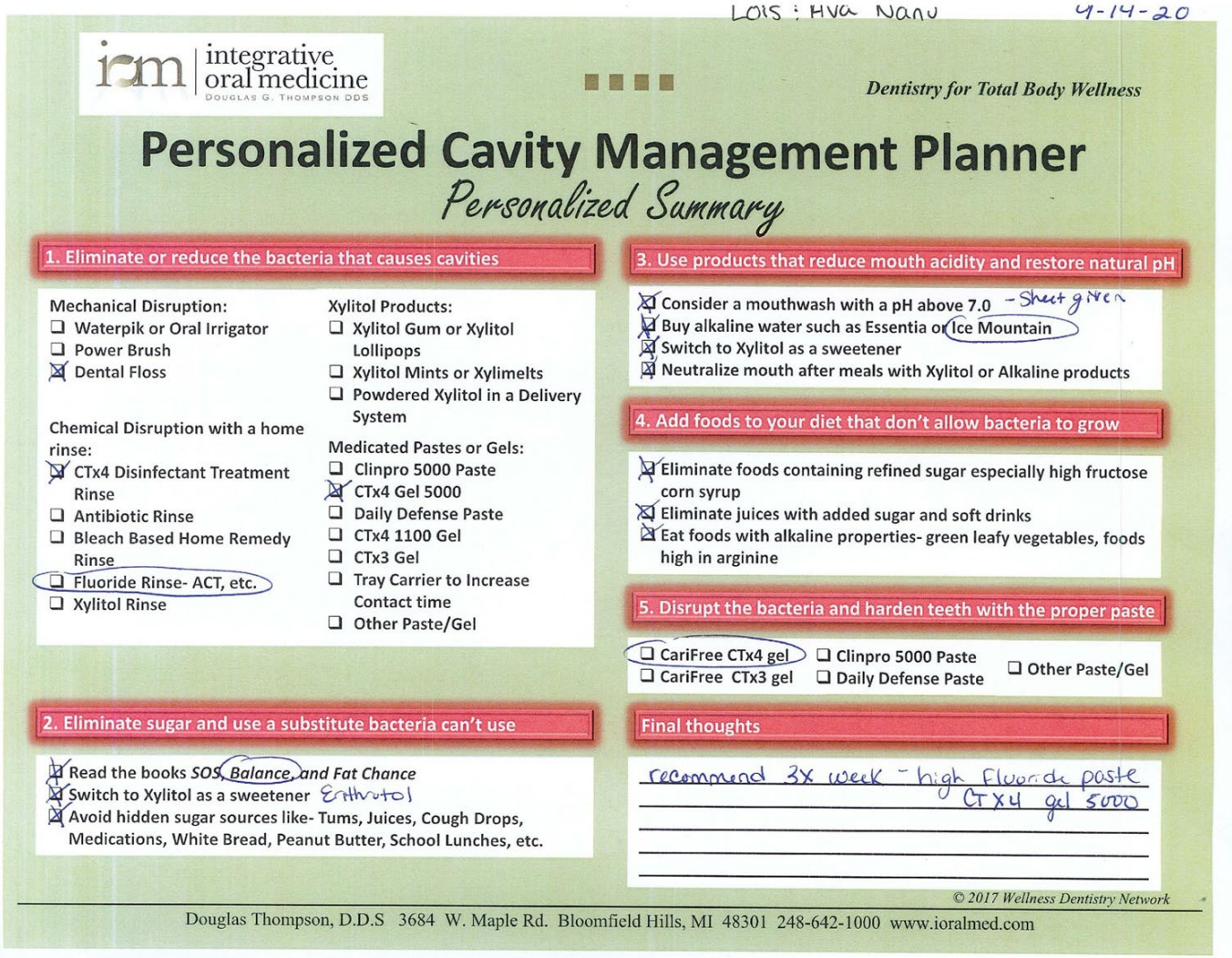





11-21-2019

**AVA HAD DECAY ON EVERY DECIDUOUS TOOTH AND ALL PERMANENT TEETH**

# Clinical Case - Ava



Lois : Hva Nanu 4-14-20

integrative oral medicine
Douglas G. Thompson DDS

*Dentistry for Total Body Wellness*

## Personalized Cavity Management Planner

*Personalized Summary*

**1. Eliminate or reduce the bacteria that causes cavities**

Mechanical Disruption:
- ❑ Waterpik or Oral Irrigator
- ❑ Power Brush
- ☒ Dental Floss

Chemical Disruption with a home rinse:
- ☒ CTx4 Disinfectant Treatment Rinse
- ❑ Antibiotic Rinse
- ❑ Bleach Based Home Remedy Rinse
- ❑ Fluoride Rinse- ACT, etc.
- ❑ Xylitol Rinse

Xylitol Products:
- ❑ Xylitol Gum or Xylitol Lollipops
- ❑ Xylitol Mints or Xylimelts
- ❑ Powdered Xylitol in a Delivery System

Medicated Pastes or Gels:
- ❑ Clinpro 5000 Paste
- ☒ CTx4 Gel 5000
- ❑ Daily Defense Paste
- ❑ CTx4 1100 Gel
- ❑ CTx3 Gel
- ❑ Tray Carrier to Increase Contact time
- ❑ Other Paste/Gel

**2. Eliminate sugar and use a substitute bacteria can't use**

- ☒ Read the books *SOS, Balance, and Fat Chance*
- ☒ Switch to Xylitol as a sweetener Erithrotol
- ☒ Avoid hidden sugar sources like- Tums, Juices, Cough Drops, Medications, White Bread, Peanut Butter, School Lunches, etc.

**3. Use products that reduce mouth acidity and restore natural pH**

- ☒ Consider a mouthwash with a pH above 7.0 - Sheet given
- ☒ Buy alkaline water such as Essentia or Ice Mountain
- ☒ Switch to Xylitol as a sweetener
- ☒ Neutralize mouth after meals with Xylitol or Alkaline products

**4. Add foods to your diet that don't allow bacteria to grow**

- ☒ Eliminate foods containing refined sugar especially high fructose corn syrup
- ☒ Eliminate juices with added sugar and soft drinks
- ☒ Eat foods with alkaline properties- green leafy vegetables, foods high in arginine

**5. Disrupt the bacteria and harden teeth with the proper paste**

- ❑ CariFree CTx4 gel
- ❑ CariFree CTx3 gel
- ❑ Clinpro 5000 Paste
- ❑ Daily Defense Paste
- ❑ Other Paste/Gel

**Final thoughts**

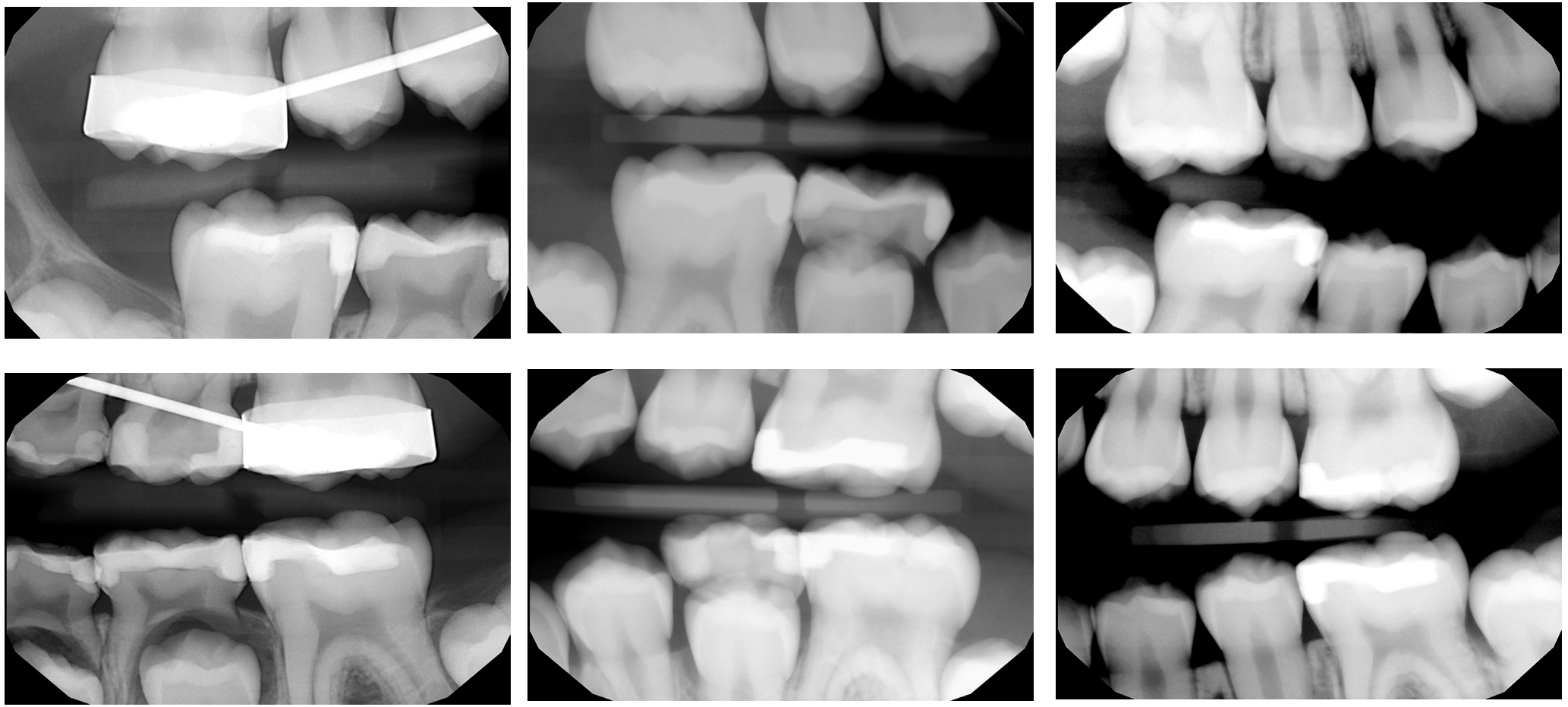
recommend 3x week - high Fluoride paste CTx4 gel 5000



Douglas Thompson, D.D.S 3684 W. Maple Rd. Bloomfield Hills, MI 48301 248-642-1000 www.ioralmed.com

- Three month recare with fluoride varnish at every other visit.
- Regular interproximal management
- Rinse twice daily with CariFree Treatment Rinse after interproximal management and before brushing with CariFree CTx4 Gel
- Incorporate xylitol or erythritol
- Use a pH balanced fluoride rinse after meals to neutralize mouth acids
- Switch bottled water to one with known pH
- Eliminate juices and any drinks with added sugar
- Read Balance book by Dr. Kutsch
- Eat foods with alkaline properties

# Clinical Case - Ava

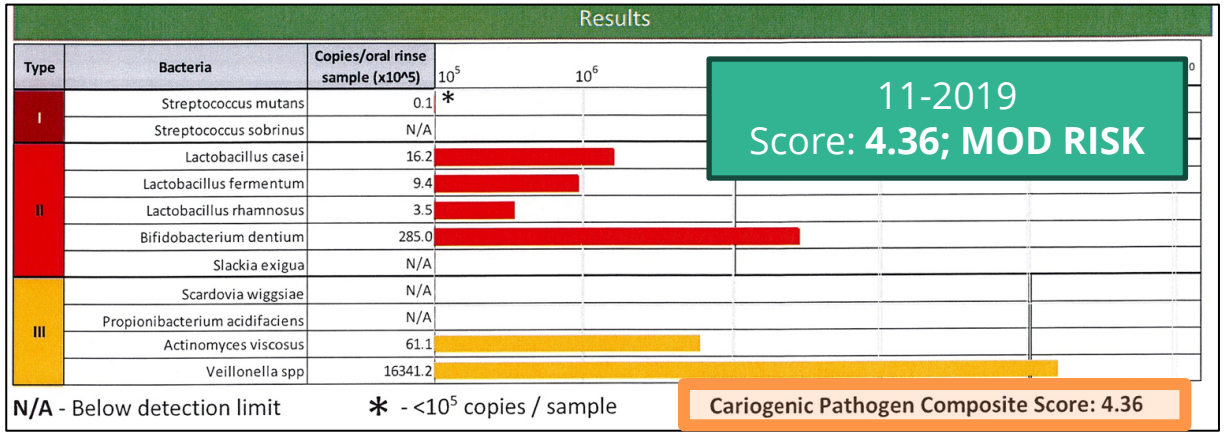


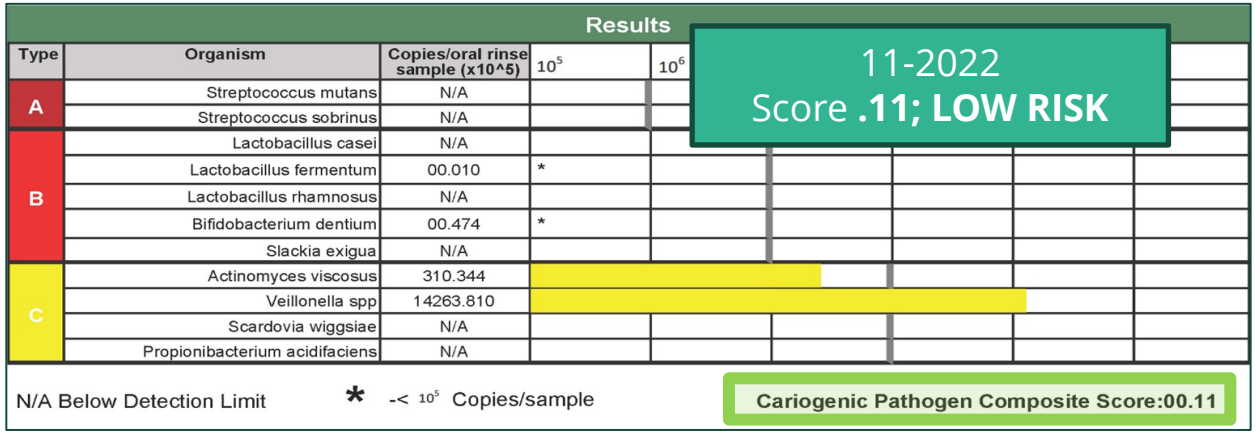
11-05-2020

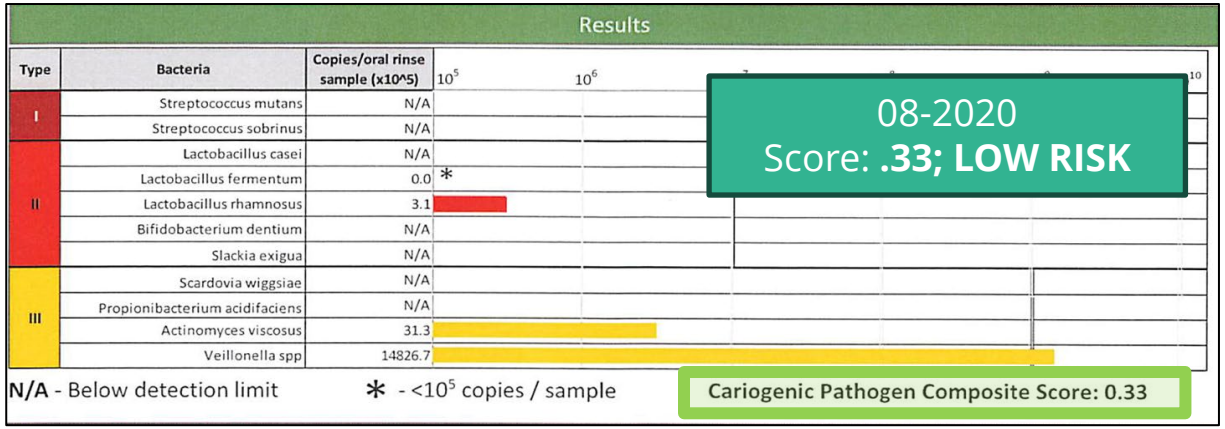
10-27-2021

5-17-2022

# Clinical Case - Ava




Ava's FIDA Lab results after three years of maintenance shows consistently lower biofilm load.

**CLINICALLY NO NEW CARIOUS LESIONS.**

**Composite Score Key**

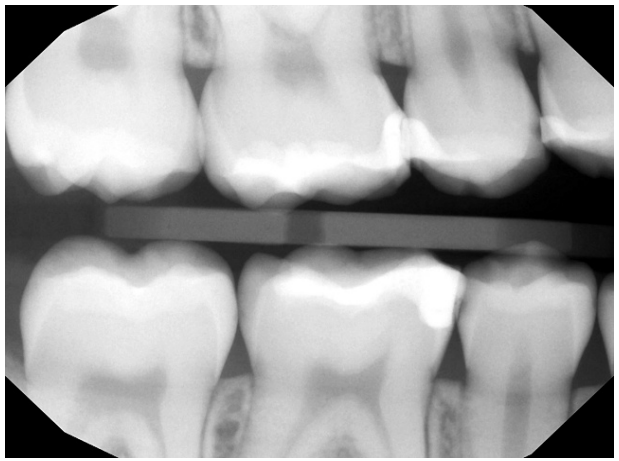
- **<1 = Low Risk**
- **> 1 but < 10 = Moderate Risk**
- **> 10 = High Risk**

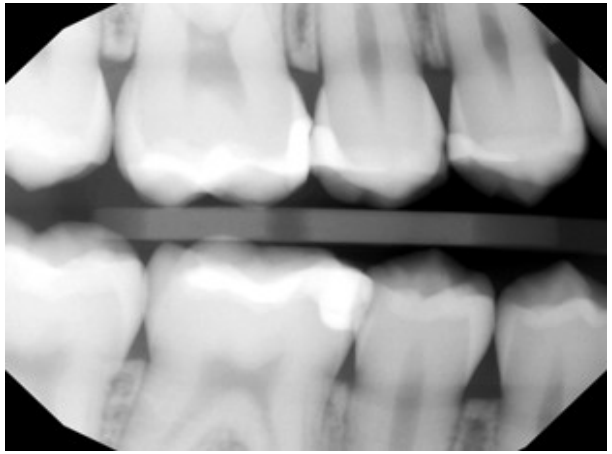
# Clinical Case - Ava

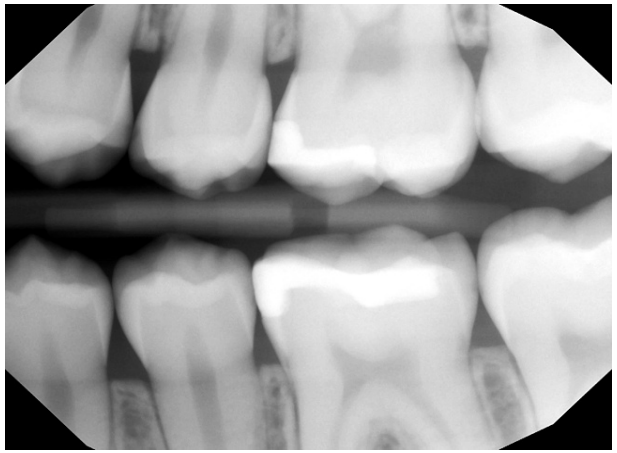
- Ava's last appointment in our office was in **November 2022 due to her family moving 1 hour away from our office**.
- She planned to continue dental care at a clinic closer to her new home.
- In early 2025, we contacted Ava's parents to follow up on her care.
- **In January 2025 (age 14), we completed a new Fidalab Comprehensive Caries test, bitewing radiographs, and clinical photos.**

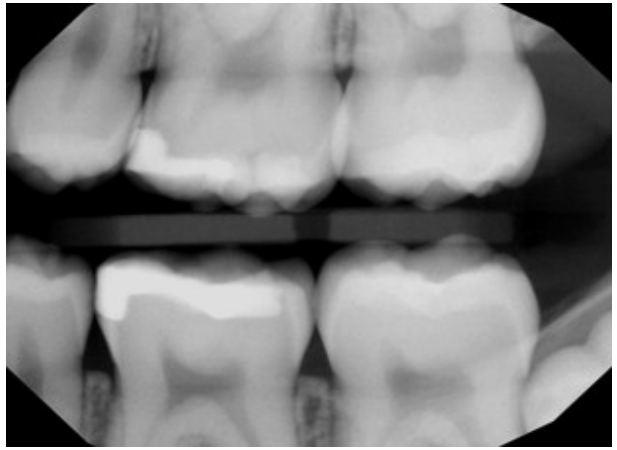
1-2025

# Clinical Case - Ava









**A. Bacteria Pathogens Results**

| Type | Organism | Copies/oral rinse sample (x10^5) | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ | $10^{10}$ |
|---|---|---|---|---|---|---|---|---|
| A | Streptococcus mutans | N/A | | | | | | |
| | Streptococcus sobrinus | N/A | | | | | | |
| B | Lactobacillus casei | N/A | | | | | | |
| | Lactobacillus fermentum | N/A | | | | | | |
| | Lactobacillus rhamnosus | N/A | | | | | | |
| | Bifidobacterium dentium | N/A | | | | | | |
| | Slackia exigua | N/A | | | | | | |
| C | Actinomyces viscosus | 00.960 | * | | | | | |
| | Veillonella spp | 2498.372 | | | | | | |
| | Scardovia wiggsiae | N/A | | | | | | |
| | Propionibacterium acidifaciens | N/A | | | | | | |

N/A Below Detection Limit  * -< $10^5$ Copies/sample

**Bacterial pathogens composite score:00.02**

**B. Fungal Pathogens Results**

| | |
|---|---|
| *Candida albicans* | *Not Detected* |
| *Candida dubliniensis* | *Not Detected* |
| *Candida parapsilosis* | *Not Detected* |
| *Candida glabrata* | *Not Detected* |
| *Candida krusei* | *Not Detected* |
| *Candida tropicalis* | *Not Detected* |
| *Candida kefyr* | *Not Detected* |
| *Candida guilliermondii* | *Not Detected* |
| *Candida lusitaniae* | *Not Detected* |
| *Candida rugosa* | *Not Detected* |

1-2025
Score: **0.02; LOW RISK**

**NO NEW CARIOUS LESIONS AND MAINTAINED LOW CARIOGENIC BACTERIAL PROFILE FOR LAST FIVE YEARS**

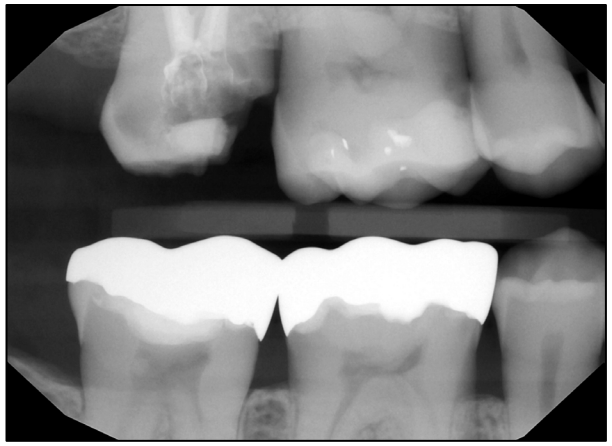
# Clinical Case - Peter

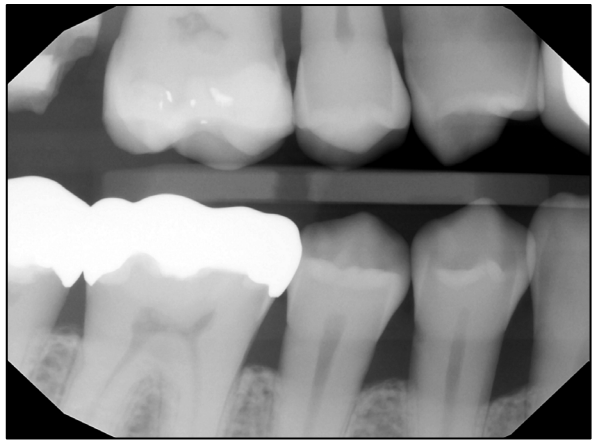
**CHIEF CONCERN: REPORTS FREQUENT CAVITIES & ONGOING ISSUES WITH ROOT CANAL ON TOOTH #15.**

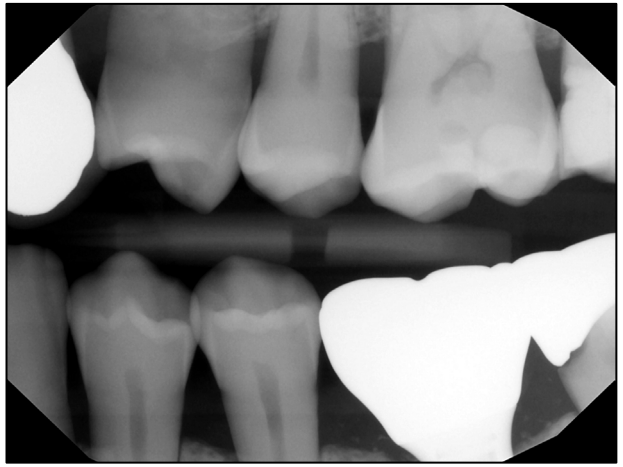
3-2025

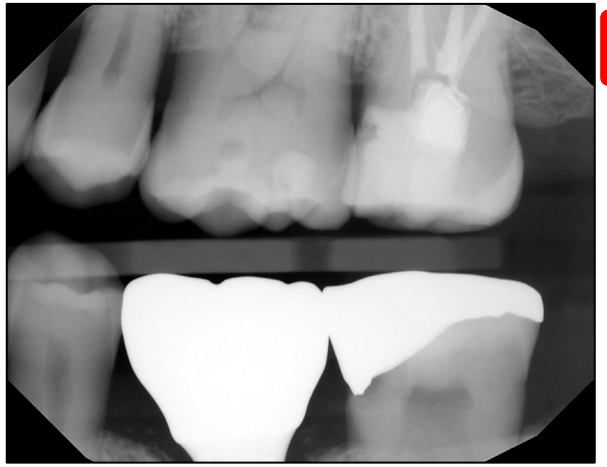
**Treatment plan: #2 crown, #3-MO, #15 crown due to recurrent decay on root surface, #18 RCT and crown.**

# Clinical Case - Peter









**A. Bacteria Pathogens Results**

| Type | Organism | Copies/oral rinse sample (x10^5) | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ | $10^{10}$ |
|---|---|---|---|---|---|---|---|---|
| A | Streptococcus mutans | 52.413 | | | | | | |
| | Streptococcus sobrinus | N/A | | | | | | |
| B | Lactobacillus casei | 737.884 | | | | | | |
| | Lactobacillus fermentum | 1435.154 | | | | | | |
| | Lactobacillus rhamnosus | 1335.157 | | | | | | |
| | Bifidobacterium dentium | 1038.053 | | | | | | |
| | Slackia exigua | N/A | | | | | | |
| C | Actinomyces viscosus | 4929.965 | | | | | | |
| | Veillonella spp | 37408.757 | | | | | | |
| | Scardovia wiggsiae | 74.059 | | | | | | |
| | Propionibacterium acidifaciens | N/A | | | | | | |

N/A Below Detection Limit * -< $10^5$ Copies/sample

**Bacterial pathogens composite score:301.12**

| | |
|---|---|
| *Candida albicans* | Detected |
| *Candida dubliniensis* | *Not Detected* |
| *Candida parapsilosis* | *Not Detected* |
| *Candida glabrata* | *Not Detected* |
| *Candida krusei* | *Not Detected* |
| *Candida tropicalis* | *Not Detected* |
| *Candida kefyr* | *Not Detected* |
| *Candida guilliermondii* | *Not Detected* |
| *Candida lusitaniae* | *Not Detected* |
| *Candida rugosa* | *Not Detected* |

3-2025
Score: **301.12; HIGH RISK**
***C. albicans* DETECTED**

# Clinical Case - Peter

- Completed all restorative work in May 2025.
- **High caries risk due to composite score of 301.12, presence of *S. mutans* and *C. albicans***
- **Prescribed a 1000 mg/tsp antibiotic/nystatin rinse to be used for 2 weeks to manage dysbiotic oral environment.**
- **Follow-up caries test scheduled for 6 weeks post-rinse.**
- Patient purchased a **Waterpik and CariFree Treatment Rinse for homecare**. Dispensed & personalized Order of Operations take-home resource to reinforce interproximal care first, therapeutic rinse second followed by brushing with Pro Gel 5000 and directed to spit out foam and don't rinse to leave the film of paste on the teeth.

3-2025 – 4-2025

# Clinical Case - Peter

- **Reported completing amoxicillin/nystatin rinse as instructed and following detailed homecare instructions.**
- Reported not rinsing with CariFree Treatment Rinse day of appointment to allow retesting but has been consistent otherwise.
- Fidalab Comprehensive Caries test and photos completed.
- **Patient reports awaiting a consult with otolaryngologist in August 2025; discomfort around #15 persisting.**

6-2025
**Post Amoxicillin + Nystatin RX Rinse (2 weeks) & homecare changes (6 weeks)**

# Clinical Case - Peter

## A. Bacteria Pathogens Results

| Type | Organism | Copies/oral rinse sample (x10^5) | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ | $10^{10}$ |
|---|---|---|---|---|---|---|---|---|
| A | Streptococcus mutans | 01.833 | | | | | | |
| | Streptococcus sobrinus | N/A | | | | | | |
| B | Lactobacillus casei | N/A | | | | | | |
| | Lactobacillus fermentum | N/A | | | | | | |
| | Lactobacillus rhamnosus | N/A | | | | | | |
| | Bifidobacterium dentium | 01.076 | | | | | | |
| | Slackia exigua | 00.046 | * | | | | | |
| C | Actinomyces viscosus | 224.474 | | | | | | |
| | Veillonella spp | 31210.178 | | | | | | |
| | Scardovia wiggsiae | 27.009 | | | | | | |
| | Propionibacterium acidifaciens | N/A | | | | | | |

N/A Below Detection Limit  * -< $10^5$ Copies/sample

**Bacterial pathogens composite score:01.57**

## B. Fungal Pathogens Results

| | |
|---|---|
| *Candida albicans* | *Not Detected* |
| *Candida dubliniensis* | *Not Detected* |
| *Candida parapsilosis* | *Not Detected* |
| *Candida glabrata* | *Not Detected* |
| *Candida krusei* | *Not Detected* |
| *Candida tropicalis* | *Not Detected* |
| *Candida kefyr* | *Not Detected* |
| *Candida guilliermondii* | *Not Detected* |
| *Candida lusitaniae* | *Not Detected* |
| *Candida rugosa* | *Not Detected* |

6-2025
Score: **1.57; LOW RISK**
**NO YEAST DETECTED**

# Clinical Case - Peter

**A. Bacteria Pathogens Results**

| Type | Organism | Copies/oral rinse sample (x10^5) | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ | $10^{10}$ |
|---|---|---|---|---|---|---|---|---|
| A | Streptococcus mutans | 01.833 | | | | | | |
| | Streptococcus sobrinus | N/A | | | | | | |
| B | Lactobacillus casei | N/A | | | | | | |
| | Lactobacillus fermentum | N/A | | | | | | |
| | Lactobacillus rhamnosus | N/A | | | | | | |
| | Bifidobacterium dentium | 01.076 | | | | | | |
| | Slackia exigua | 00.046 | * | | | | | |
| C | Actinomyces viscosus | 224.474 | | | | | | |
| | Veillonella spp | 31210.178 | | | | | | |
| | Scardovia wiggsiae | 27.009 | | | | | | |
| | Propionibacterium acidifaciens | N/A | | | | | | |

N/A Below Detection Limit  * -< $10^5$ Copies/sample

**Bacterial pathogens composite score:01.57**

**B. Fungal Pathogens Results**

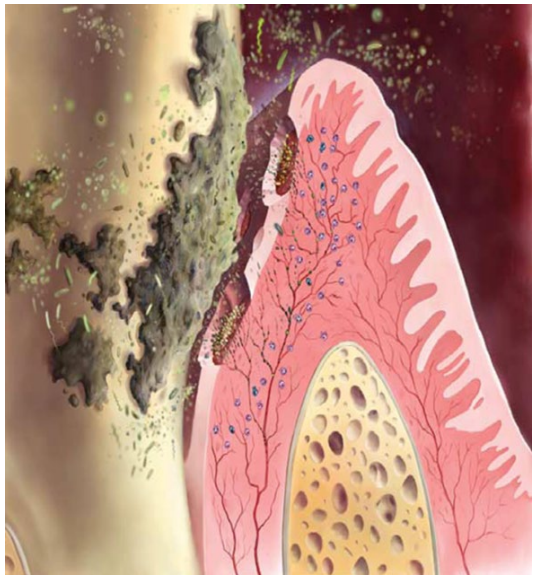
| | |
|---|---|
| *Candida albicans* | *Not Detected* |
| *Candida dubliniensis* | *Not Detected* |
| *Candida parapsilosis* | *Not Detected* |
| *Candida glabrata* | *Not Detected* |
| *Candida krusei* | *Not Detected* |
| *Candida tropicalis* | *Not Detected* |
| *Candida kefyr* | *Not Detected* |
| *Candida guilliermondii* | *Not Detected* |
| *Candida lusitaniae* | *Not Detected* |
| *Candida rugosa* | *Not Detected* |

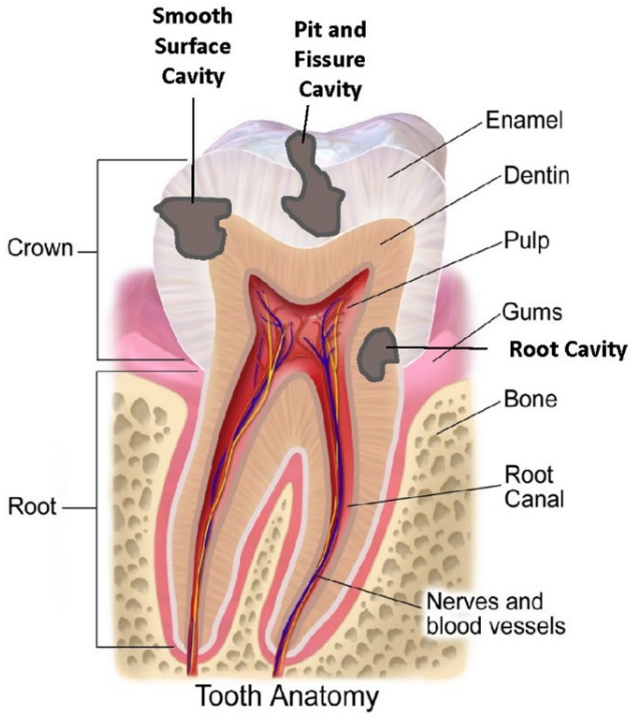
6-2025
Score: **1.57; LOW RISK**
**NO YEAST DETECTED**

## WHAT DOES THIS MEAN?

**By addressing Peter's restorative needs, adjusting his homecare, and shifting one of the main underlying etiological agents of caries development (his dysbiotic microbiome), we were successfully able to alter his biofilm to healthier metrics. If a similar patterns emerges with caries management like we see with periodontal disease this approach should provide long-term oral and systemic health.**

# Periodontal Disease and Caries





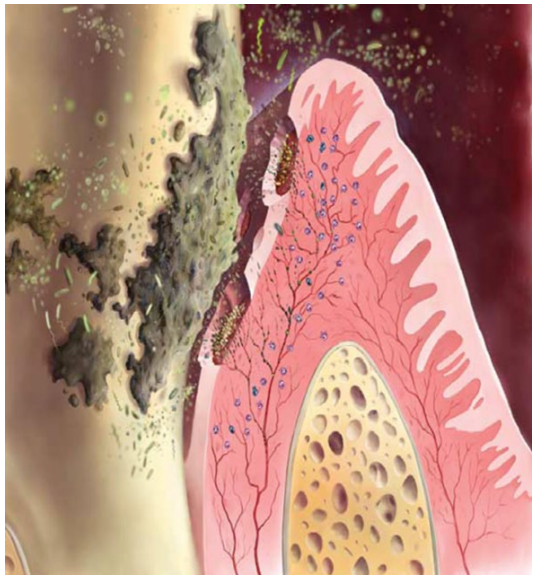

Two main determinants of disease etiology and progression

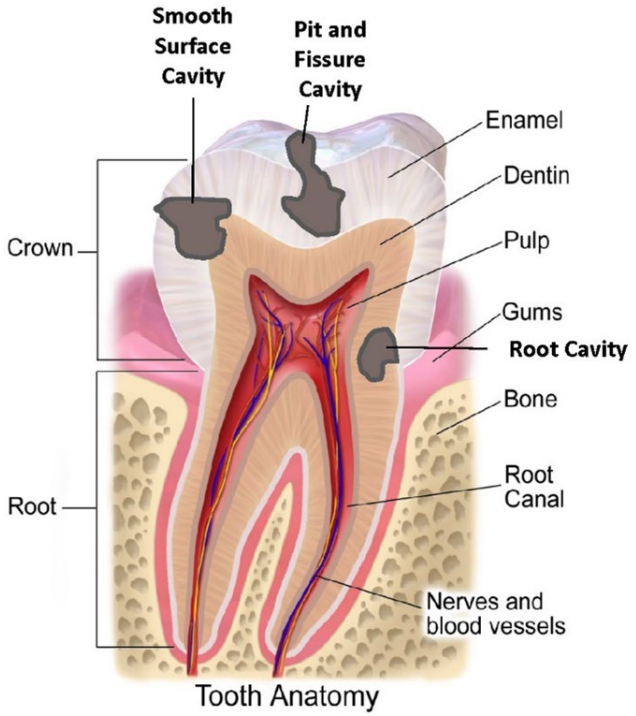
1. Microbiome or Biofilm Composition = Bacteria, Yeast, and Viruses

1. Host Modifying Factors – Risk Modifier Form – Health History, Medical History, Radiographs, and Lifestyle Risk Indicators

*"Biology of the Periodontal Connective Tissues;* P. Mark Bartold, PhD, DDSc, FRACDS (PERIO); A. Sampath Narayanan, PhD ; Quintessence: 1998, p.201

# Periodontal Disease and Caries





Tooth Anatomy

Two main determinants of disease etiology and progression

1. Microbiome or Biofilm Composition = Bacteria, Yeast, and Viruses

1. Host Modifying Factors – Risk Modifier Form – Health History, Medical History, Radiographs, and Lifestyle Risk Indicators

**Biofilm Induced and Host Modulated**

*"Biology of the Periodontal Connective Tissues;* P. Mark Bartold, PhD, DDSc, FRACDS (PERIO); A. Sampath Narayanan, PhD ; Quintessence: 1998, p.201

# REFERENCES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Matias Regis, W. F., Ruliglésio Rocha, F., Araújo Lima, R., Panariello, B., Duarte, S., da Cunha Costa, A., Brilhante, R. S. N., & Rodrigues, L. K. A. (2025). Insights into the role of Streptococcus mutans and Candida albicans in dental biofilm formation and cariogenicity: A literature review. Cureus, 17(6), e86159. https://doi.org/10.7759/cureus.86159

Spatafora, G., Li, Y., He, X., Cowan, A., & Tanner, A. C. R. (2024). The evolving microbiome of dental caries. Microorganisms, 12(1), 121. https://doi.org/10.3390/microorganisms12010121

Sulyanto, R. M., Beall, C. J., Ha, K., Montesano, J., Juang, J., Dickson, J. R., Hashmi, S. B., Bradbury, S., Leys, E. J., Edgerton, M., Ho, S. P., & Griffen, A. L. (2024). Fungi and bacteria occupy distinct spatial niches within carious dentin. PLoS Pathogens, 20(5), e1011865. https://doi.org/10.1371/journal.ppat.1011865

Yon, M. J. Y., Gao, S. S., Chen, K. J., Duangthip, D., Lo, E. C. M., & Chu, C. H. (2019). Medical model in caries management. Dentistry Journal, 7(2), 37. https://doi.org/10.3390/dj7020037

# Thank You!


Scan to learn more
about Dr. Thompson,
the Wellness Dentistry
Network, and more!

# Caries Disease Exposed:
## The Future of Nano HA and Fluoride

V. Kim Kutsch, DMD.

# Personal Disclosure

Dentist Private Practice 42 years

CEO Oral Biotech

Author: Balance, Why Me?

Podcast: Contrary to Ordinary

# Today's Topics

Fluoride Benefits vs. Risk

Nano-HA  Benefits vs. Risk

# The Role of Fluoride

## Benefits versus Risks

# The Case for Fluoride

Fluoride is not a remineralization agent...

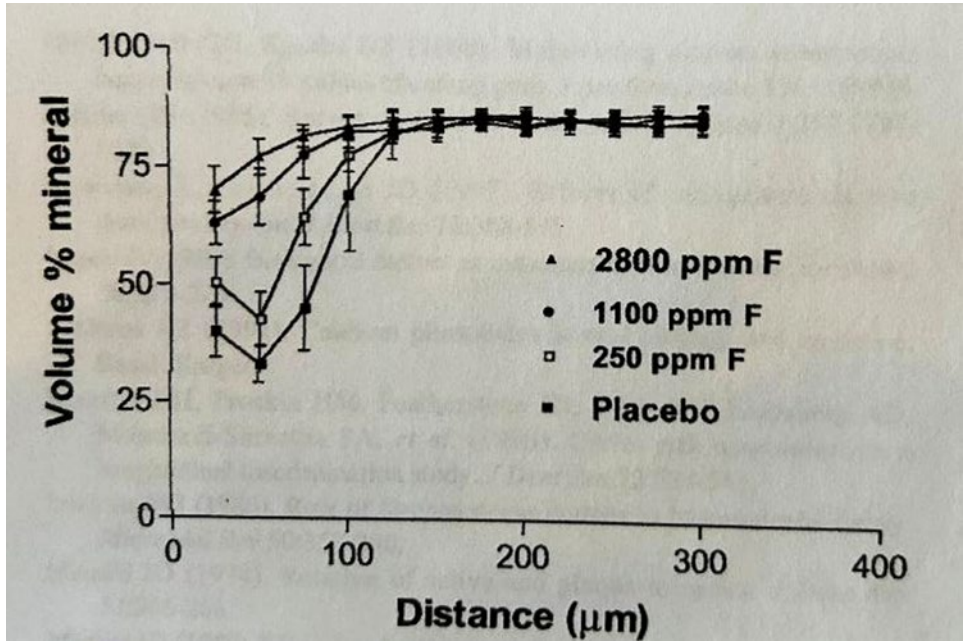
It is an anti-caries agent!

- Strongest small negative charged ion
- Strong attraction to Ca++ ions

- Reduces microbial acid production, (potentiated by xylitol)
- Accelerates remineralization
- Enhances remineralization (increases degree of crystallinity)
- Makes enamel more resistant to demineralization

Featherstone JDB. The Continuum of Dental Caries--Evidence for a Dynamic Disease Process. Journal of Dental Research 2004. 83: C39. DOI: 10.1177/154405910408301S08

"The reversal of demineralization also occurs at the atomic level when calcium, phosphate, and fluoride come together to build a new surface onto the existing crystal remnants that have remained following demineralization."



# The benefits are well established:

Reduces DMFT scores in children and adolescents

Reduced oral health disparity

Most important global health intervention of the 20th century

Slade GD, Grider WB, Maas WR, Sanders AE. Water Fluoridation and Dental Caries in U.S. Children and Adolescents. J Dent Res. 2018 Sep;97(10):1122-1128.

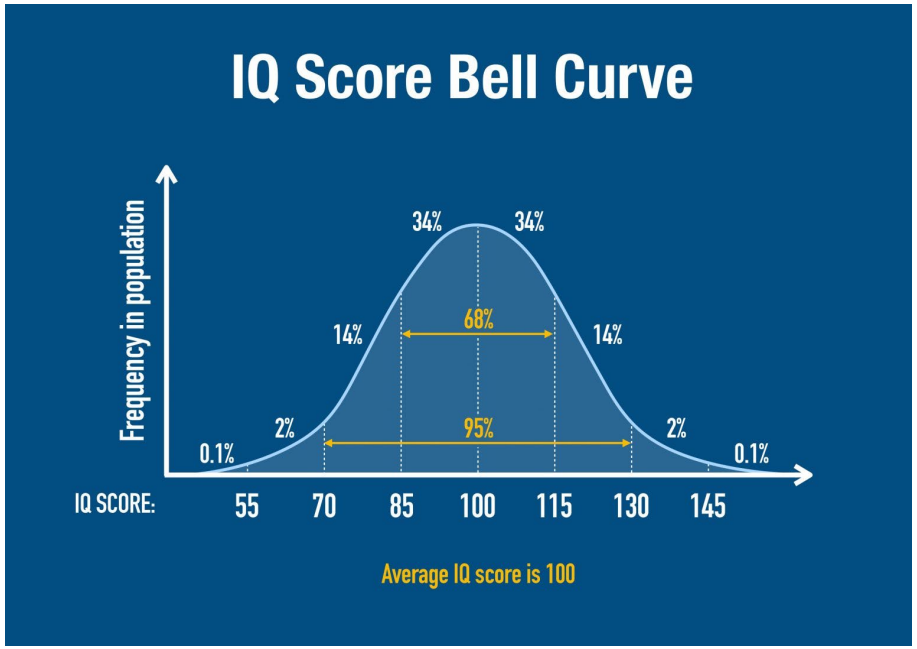
"Community water fluoridation resulted in a prevented fraction of 30% in primary dentition. The difference was also statistically significant, although less pronounced, in the permanent dentition representing a prevented fraction of 12%."

Iheozor-Ejiofor Z, Walsh T, Lewis SR, Riley P, Boyers D, Clarkson JE, Worthington HV, Glenny AM, O'Malley L. Water fluoridation for the prevention of dental caries. Cochrane Database Syst Rev. 2024 Oct 4;10(10):CD010856. doi: 10.1002/14651858.CD010856.pub3. PMID: 39362658; PMCID: PMC11449566.

"Contemporary studies indicate that initiation of CWF may lead to a slightly greater reduction in dmft and may lead to a slightly greater increase in the proportion of caries-free children, but with smaller effect sizes than pre-1975 studies. There is insufficient evidence to determine the effect of cessation of CWF on caries and whether water fluoridation results in a change in disparities in caries according to socioeconomic status."

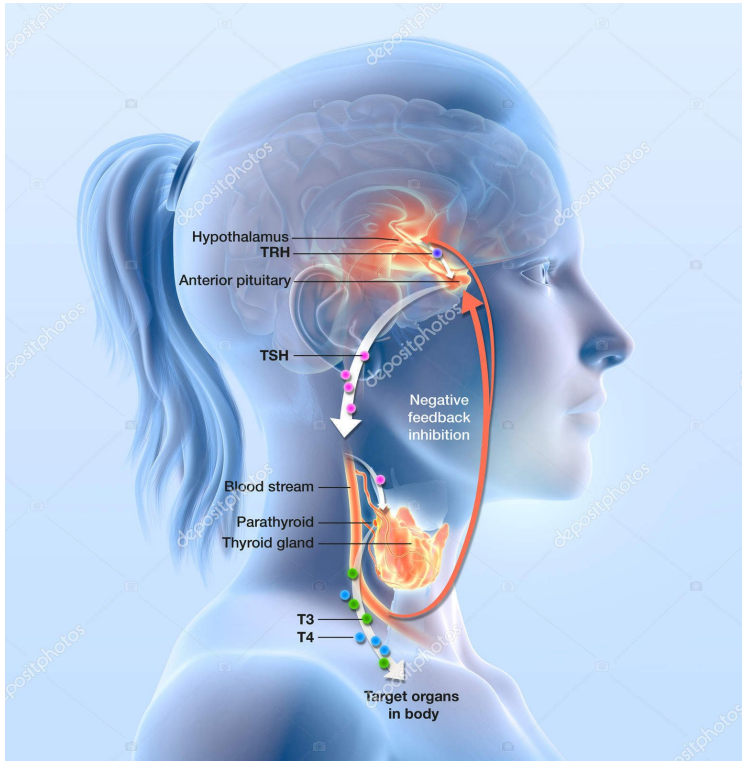
Do LG, Sawyer A, John Spencer A, Leary S, Kuring JK, Jones AL, Le T, Reece CE, Ha DH. Early Childhood Exposures to Fluorides and Cognitive Neurodevelopment: A Population-Based Longitudinal Study. J Dent Res. 2025 Mar;104(3):243-250. doi: 10.1177/00220345241299352. Epub 2024 Dec 18. PMID: 39692252; PMCID: PMC11843800. 357  16-26 yo

"The hypothesis of noninferiority tests found that full-scale IQ (FSIQ) scores of those exposed and nonexposed to fluoride were equivalent. The study provided consistent evidence that early childhood exposure to fluoride does not have effects on cognitive neurodevelopment."



Barberio AM, Hosein FS, Quiñonez C, McLaren L. Fluoride exposure and indicators of thyroid functioning in the Canadian population: implications for community water fluoridation. J Epidemiol Community Health. 2017 Oct;71(10):1019-1025. doi: 10.1136/jech-2017-209129. Canadian Health Measure Survey.

"These analyses suggest that, at the population level, fluoride exposure is not associated with impaired thyroid functioning in a time and place where multiple sources of fluoride exposure, including CWF, exist."



# The Case against Fluoride

Fluoride has potential negative dental and systemic effects health risks

# The risks cannot be ignored:

Fluorosis

Thyroid hormones interference

Developmental neural function, IQ

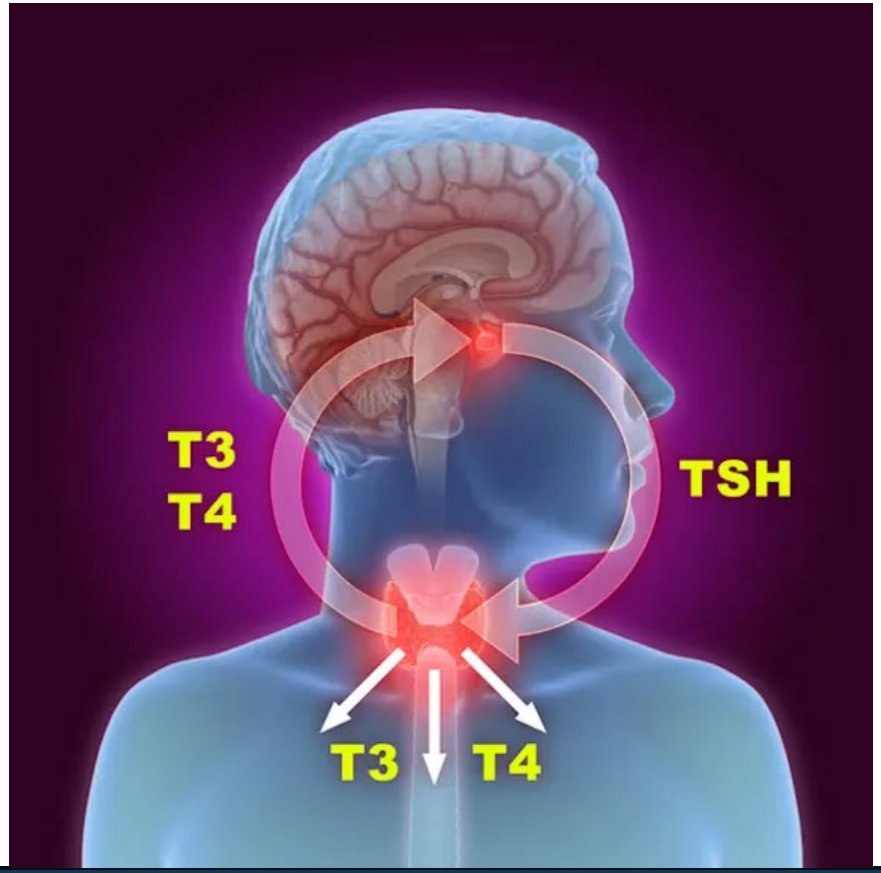
Mechanism AMPK

Taher MK, Momoli F, Go J, Hagiwara S, Siva Ramoju S, Xuefeng Hu X, Jensen N, Terrell R, Hemmerich A, Krewski D.  Systematic review of epidemiological and toxicological evidence on health effects of fluoride in drinking water. Critical Reviews in Toxicology 2024. 54:1, 2-34, Sys Rev 89 hmn, 199 anml, 10 in vitr

"A point of departure of 1.56 mg fluoride/L for moderate dental fluorosis may be preferred as a starting point for setting a health based value for fluoride in drinking water to protect against moderate and severe dental fluorosis.

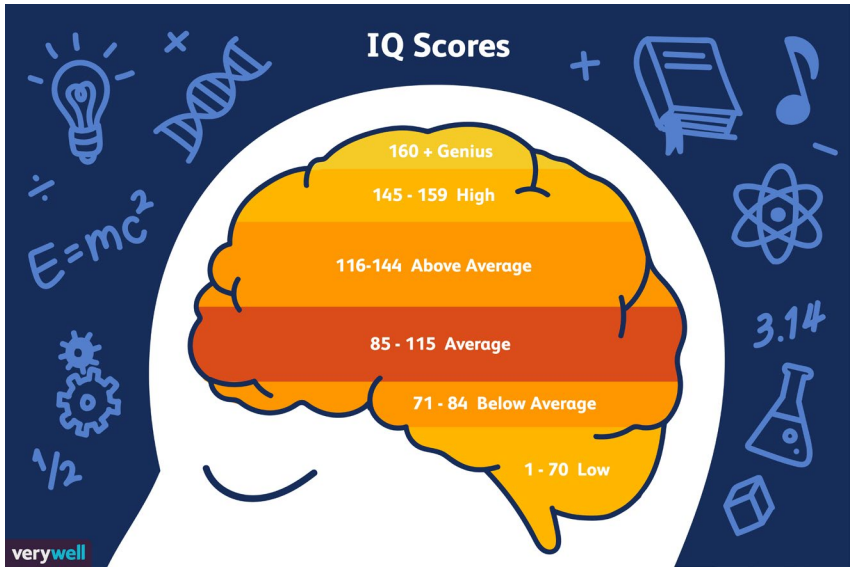
Kheradpisheh Z, Mirzaei M, Mahvi AH, Mokhtari M, Azizi R, Fallahzadeh H, Ehrampoush MH. Impact of Drinking Water Fluoride on Human Thyroid Hormones: A Case- Control Study. Sci Rep. 2018 Feb 8;8(1):2674. case- control study 198 cases and 213 controls

"It was found that fluoride has impacts on TSH, T3 hormones even in the standard concentration of less than 0.5 mg/L. Application of standard household water purification devices was recommended for hypothyroidism."



Grandjean P. Developmental fluoride neurotoxicity: an updated review. Environ Health. 2019 Dec 19;18(1):110. doi: 10.1186/s12940-019-0551-x. PMID: 31856837; PMCID: PMC6923889. integrated literature review.

"Neurotoxicity appeared to be dose-dependent, and tentative benchmark dose calculations suggest that safe exposures are likely to be below currently accepted or recommended fluoride concentrations in drinking water...The recent epidemiological results support the notion that elevated fluoride intake during early development can result in IQ deficits that may be considerable."



National Toxicology Program USD HHS, Fluoride Exposure: Neurodevelopment and Cognition
CASRN: 16984-48-8, January 6, 2025, Sys Rev

"The NTP monograph concluded, with moderate confidence, that higher levels of fluoride exposure, such as drinking water containing more than 1.5 milligrams of fluoride per liter, are associated with lower IQ in children. The NTP review was designed to evaluate total fluoride exposure from all sources and was not designed to evaluate the health effects of fluoridated drinking water alone. It is important to note that there were insufficient data to determine if the low fluoride level of 0.7 mg/L currently recommended for U.S. community water supplies has a negative effect on children's IQ."

Ahuja T, Begum F, Beegum F, Kumar G, Kumar N, Shenoy RR. Fluoride-induced Neurodevelopmental Toxicity- AMPK as a Possible Target. CNS Neurol Disord Drug Targets. 2025 Feb 24. doi: 10.2174/0118715273300345250206084817. Epub ahead of print. PMID: 39995130.

"The present review captures fluoride, its role in neurodevelopment, and mechanisms & pathways involved by which fluoride can hurt neurodevelopment & how AMPK can be a possible therapeutic target."

Liu H, Gao Y, Sun L, Li M, Li B, Sun D. Assessment of relationship on excess fluoride intake from drinking water and carotid atherosclerosis development in adults in fluoride endemic areas, China. Int J Hyg Environ Health. 2014 Mar;217(2-3):413-20. doi: 10.1016/j.ijheh.2013.08.001. Epub 2013 Aug 14. PMID: 24012047. 1.5-25ppm 585 ad

"The findings of the research study revealed a significant positive relationship between excess fluoride exposure from drinking water and prevalence of carotid artery atherosclerosis in adults living in fluoride endemic areas. The possible mechanism was the excess fluoride induced the decreasing level of GPx causing the systemic inflammation and endothelial activation by oxidative stress."

Vieira AR. Fluoride Toxicity. Monogr Oral Sci. 2021;30:140-148. doi: 10.1159/000520789. Epub 2022 Jan 25. PMID: 35078188.

"Fluoridation of toothpastes also provides the same impact on dental caries experience in populations. It is reasonable to propose that water fluoridation may not be implemented anymore since there is a feasible and effective replacement for it."

# Clinical Study 2025

- 20 participants aged 6-70
- Only variable was fluoride oral care products: gel
- Measured urine fluoride levels with fluoride ion probe
- 2 weeks using fluoride free Carifree gel to establish baseline
- 2 weeks using Carifree Gel 1100
- Examined individual data, and pooled data

- *Urinary fluoride

# Results:

| Participants (20) | Baseline Fluoride ppm | 2 week 1100 Fluoride Gel ppm |
|---|---|---|
| Adults (11) | 0.27 | 0.24 |
| Adolescents (9) | 0.15 | 0.13 |
| Total Averages | 0.20 | 0.19 |

# Conclusions:

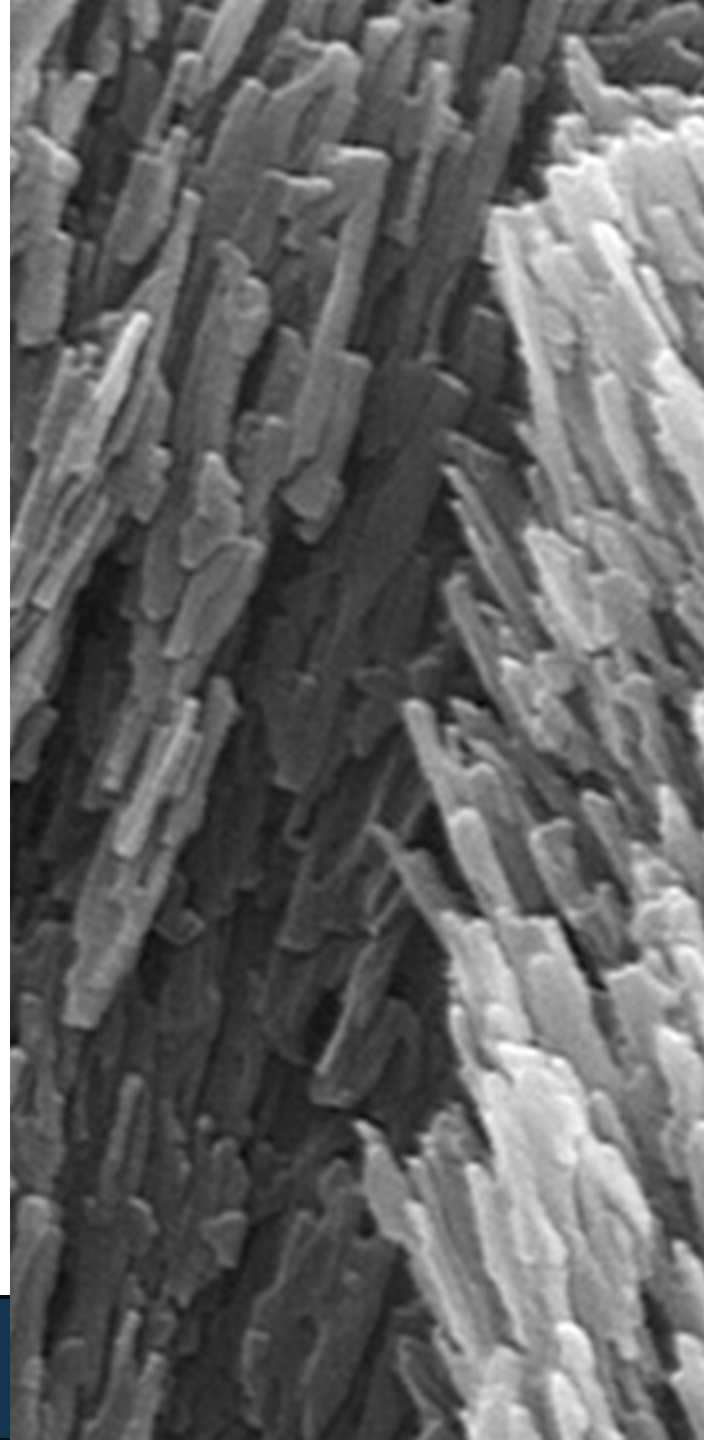
Within the limits of the study, use of topical fluoride containing oral care products did not result in any measurable increase in systemic exposure to fluoride.

# The Role of Nano-HA:

## Benefit versus Risk

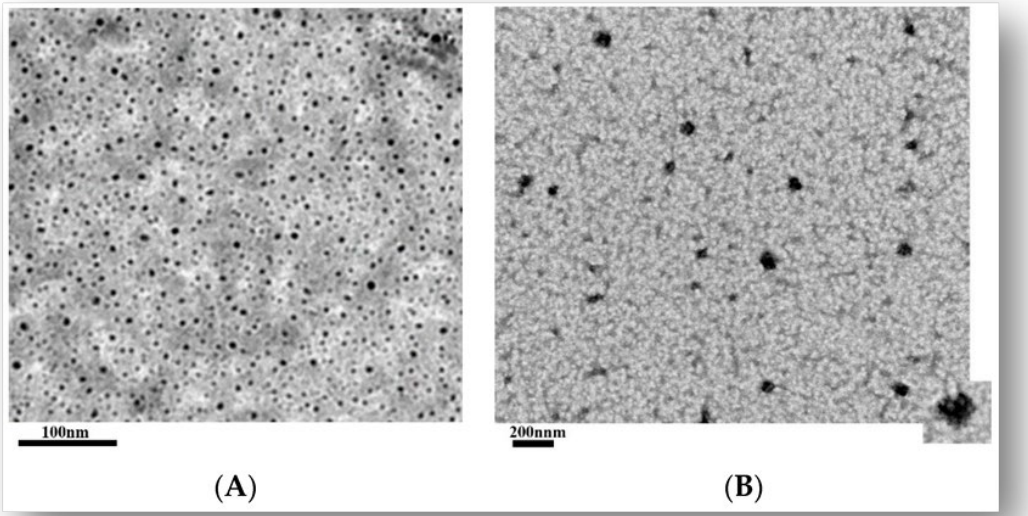
# What do we know about nano-HA as a strategy?

- Saliva is supersaturated with nHA 20 nm
- Acts directly and as a reservoir for Ca++ and PO4
- Remineralization as good as/superior to fluoride
- Concentration does not matter 2-10%
- Size matters 20nm, not 200nm
- Shape matters, block shaped
  versus needle-shaped
- Europe has banned all needle shaped nano-HA



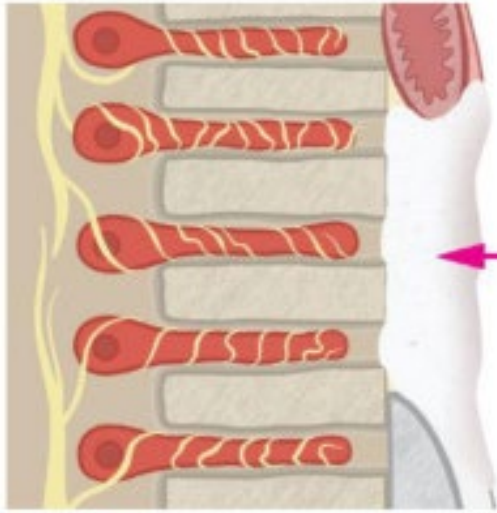
Pepla E, Besharat LK, Palaia G, Tenore G, Migliau G. Nano-hydroxyapatite and its applications in preventive, restorative and regenerative dentistry: a review of literature. Ann Stomatol (Roma). 2014 Nov 20;5(3):108-14. Rev.

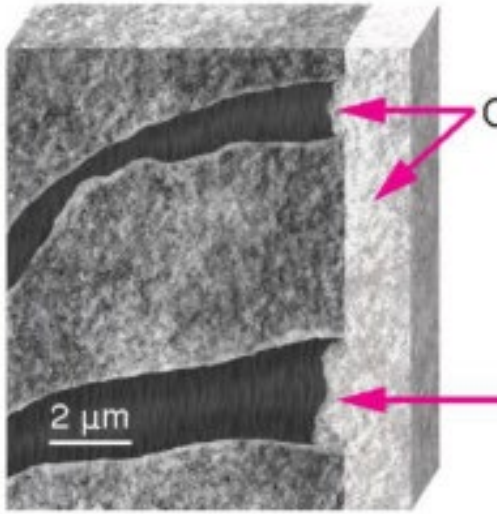
"In terms of restorative and preventive dentistry, nano-hydroxyapatite has significant remineralizing effects on initial enamel lesions, certainly superior to conventional fluoride, and good results on the sensitivity of the teeth."



Limeback H, Enax J, Meyer F. Clinical Evidence of Biomimetic Hydroxyapatite in Oral Care Products for Reducing Dentin Hypersensitivity: An Updated Systematic Review and Meta-Analysis. Biomimetics (Basel). 2023 Jan 6;8(1):23.

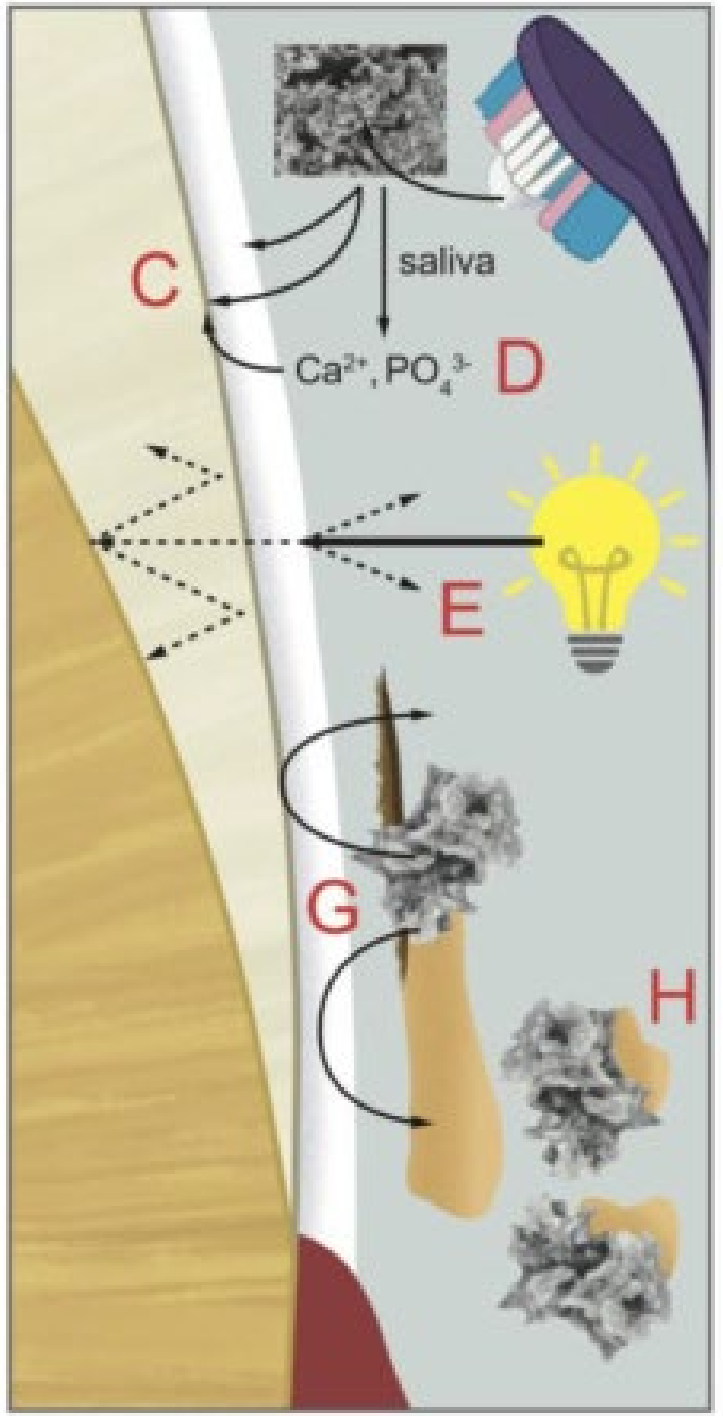
"In conclusion, the meta-analysis showed that HAP added to oral care products is a more effective agent than fluoride in controlling dentin hypersensitivity and may be superior to other desensitizers."

Limeback H, Meyer F, Enax J. Tooth Whitening with Hydroxyapatite: A Systematic Review. Dent J (Basel). 2023 Feb 12;11(2):50.

"The evidence from in vivo clinical trials is supported by modest clinical evidence based on six preliminary clinical trials. It can be concluded that the regular use of hydroxyapatite-containing oral care products effectively whitens teeth, but more clinical trials are required to support the preliminary in vivo evidence."



Haghgoo R, Rezvani MB, Salehi Zeinabadi M. Comparison of nano-hydroxyapatite and sodium fluoride mouthrinse for remineralization of incipient carious lesions. J Dent (Tehran). 2014 Jul;11(4):406-10. Epub 2014 Jul 31. PMID: 25584051; PMCID: PMC4283741.

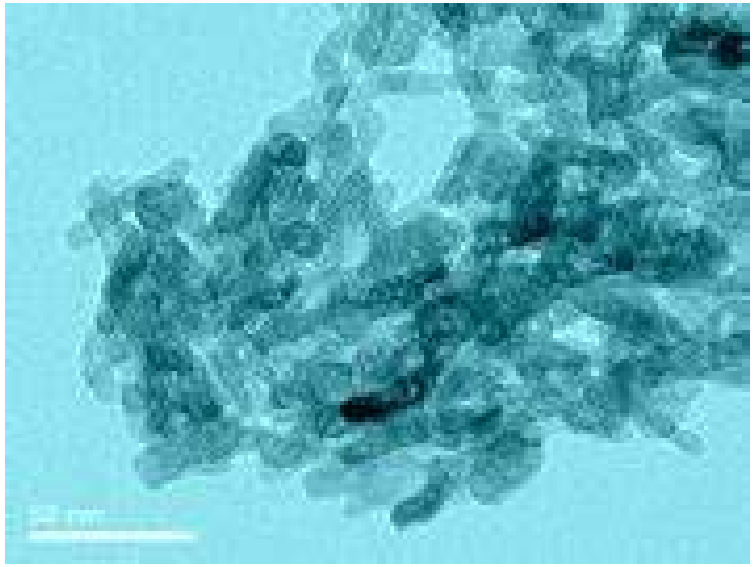
"Microhardness of all samples decreased significantly after immersion in the demineralization solution and increased following immersion in nano-HA and NAF mouthrinses; however, this increase was not statistically significant."

0%, 2%, 5%, 10% nano-HA

0.2% NaF

Imran E, Cooper PR, Ratnayake J, Ekambaram M, Mei ML. Potential Beneficial Effects of Hydroxyapatite Nanoparticles on Caries Lesions In Vitro-A Review of the Literature. Dent J (Basel). 2023 Feb 7;11(2):40. doi: 10.3390/dj11020040. PMID: 36826185; PMCID: PMC9955150.

"Data showed that nHAP has potential to promote mineralization in initial caries and subsequently increased mineral content and hardness. Notably, it is the particle size of nHAP which plays an important role in the mineralization process."



20 nm

# The Case against nano-HA

Nano-hydroxyapatite has potential negative systemic health risks

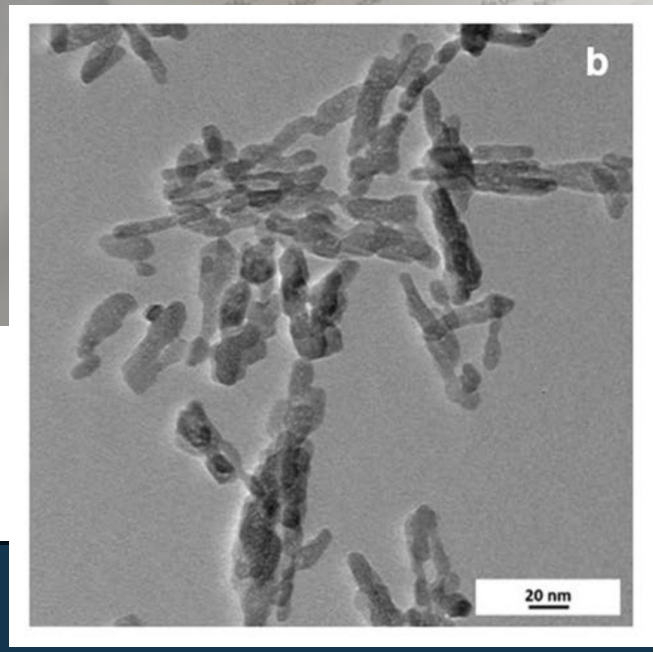
# Scientific Committee of Consumer Safety – SCCS Opinion May 2023

- "SCCS considers hydroxyapatite (nano) safe when used at concentrations up to 10% in toothpaste, and up to 0.465% in mouthwash. This safety evaluation only applies to the hydroxyapatite (nano) with the following characteristics:
- • composed of rod-shaped particles of which at least 95.8% (in particle number) have an aspect ratio of less than 3, and the remaining 4.2% have an aspect ratio not exceeding 4.9;
- • the particles are not coated or surface modified."
- EC notified WTO May 23, 2023:
- EU adds nano-hydroxyapatite restrictions (max use 10% in toothpaste, 0.465% mouthwash) to the Cosmetics Regulation (EC) No 1223/2009. The proposed date of adoption is 3rd Q 2023—18 months for industry to comply.

# Fluidinova NanoXIM$_{tm}$

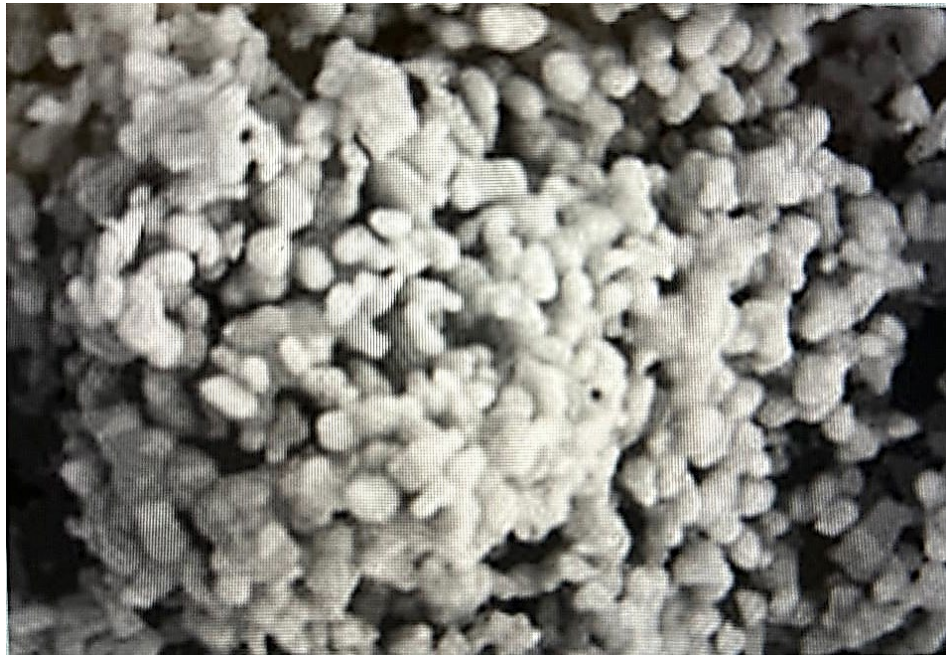
"The nanoXIM·CarePaste manufactured by FLUIDINOVA is now the only nano-hydroxyapatite (nHAp) in the world scrutinized and approved as safe for oral care cosmetics by the Scientific Committee on Consumer Safety (SCCS) European authorities."

*Budenheim

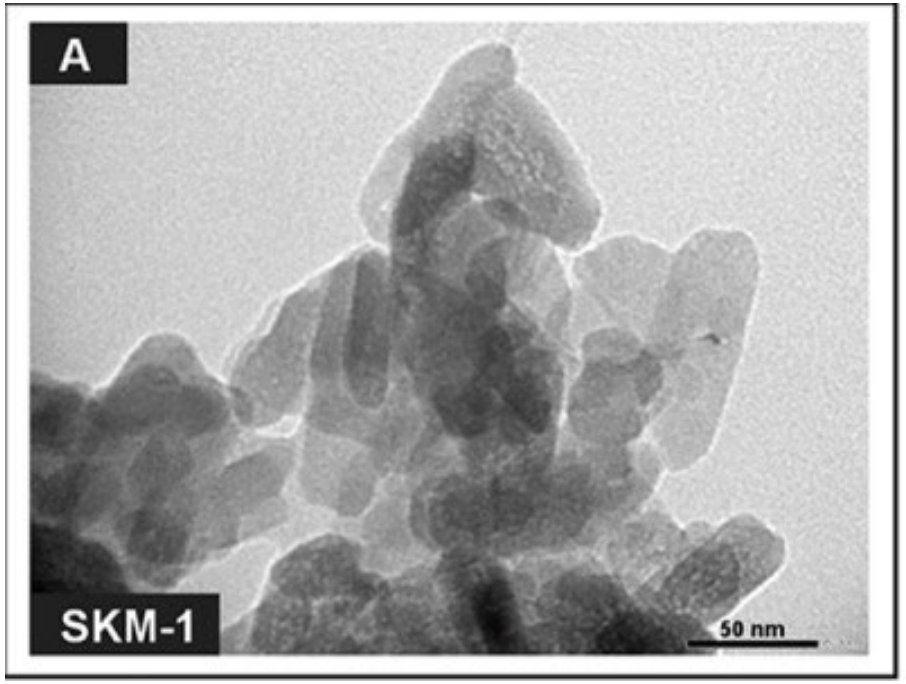
Rao CY, Sun XY, Ouyang JM. Effects of physical properties of nano-sized hydroxyapatite crystals on cellular toxicity in renal epithelial cells. Mater Sci Eng C Mater Biol Appl. 2019 Oct;103:109807. doi: 10.1016/j.msec.2019.109807. Epub 2019 May 30. PMID: 31349397.

"We studied the toxic effects and mechanisms of four different types of nano-HAP crystals (H-Sphere, 72.5 nm × 72.5 nm; H-Needle, 37.2 nm × 162.7 nm; H-Rod, 42.3 nm × 115.3 nm; and H-Plate, 145.5 nm × 272.9 nm) on human renal proximal tubular epithelial cells....The cytotoxicity of the four kinds of HAP crystals was ranked as follows: H-Sphere > H-Needle > H-Rod > H-Plate."



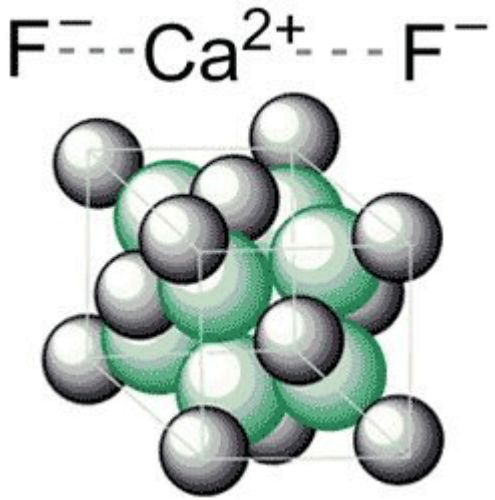
Komiyama S, Miyasaka R, Kikukawa K, Hayman R. Can nano-hydroxyapatite permeate the oral mucosa? A histological study using three-dimensional tissue models. PLoS One. 2019 Apr 23;14(4):e0215681. doi: 10.1371/journal.pone.0215681. PMID: 31013294; PMCID: PMC6478310..

"Furthermore, since the exposure dosage of n-HAP used in this study was much larger than the likely exposure during actual toothbrushing, it was concluded that n-HAP particles are very unlikely to enter the blood stream or systemic tissue via intact oral mucosa."

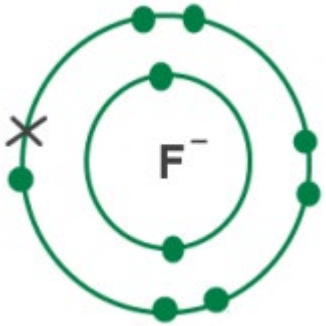


Rodemer T, Pütz N, Hannig M. Influence of hydroxyapatite nanoparticles on the formation of calcium fluoride surface layer on enamel and dentine in vitro. Sci Rep. 2022 Oct 20;12(1):17612. doi: 10.1038/s41598-022-21545-1. PMID: 36266387; PMCID: PMC9584963.

"Application of pure fluoride compounds resulted in a more homogeneous calcium fluoride surface layer with higher persistence in comparison to the combination of fluoride and nano-HAP. Interaction between fluoride and nano-HAP clearly could be proved. On enamel as well as dentine surfaces, the combined application of nano-HAP and fluoride has a negative effect on the stability and persistence of the calcium fluoride surface precipitate."



# The correct question isn't what percentage is the nanoHA?



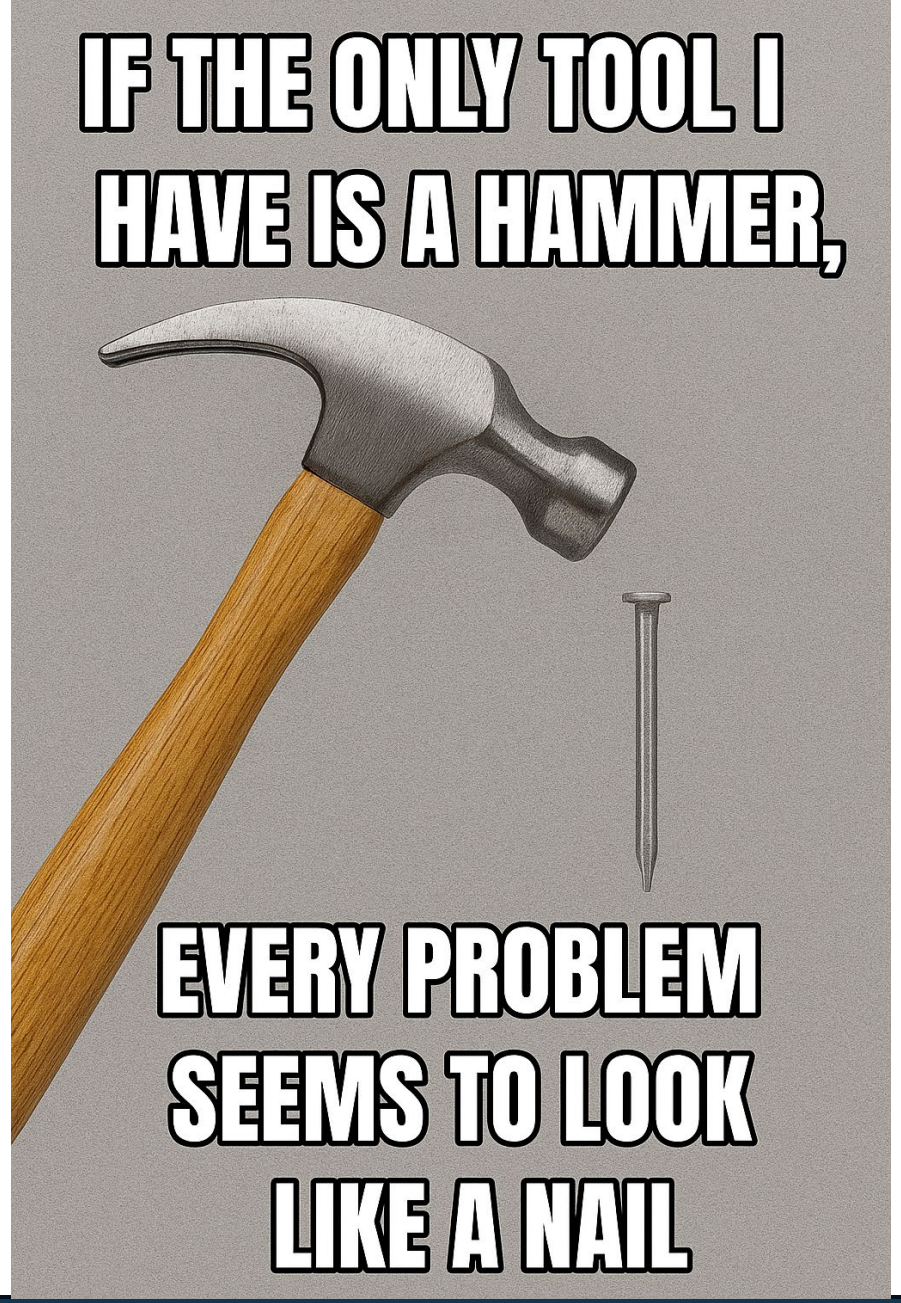

# The questions should be:

- What is the source, size and shape of the nano-HA?
- What is the remineralization result?
- What is the actual level of available fluoride ions?

# Conversations That Will Reshape Caries Disease!

**A call to action for all of us to unite in early recognition and root cause identification for Caries Disease among all ages**

Susan Maples, DDS, MSBA


IF THE ONLY TOOL I HAVE IS A HAMMER,
EVERY PROBLEM SEEMS TO LOOK LIKE A NAIL


This is *not* treatment
for caries disease


Treatment ??


**Caries Disease**

AWARENESS MONTH

# And this is *prevention*

Infant Oral Health Exam


...because two is too late!

# It’s 100% preventable!

# Open Evidence

**Vertical transmissibility of Streptococcus mutans in saliva from mothers to babies is well established, with genetic and epidemiological studies consistently demonstrating that mothers are the primary source of S. mutans colonization in infants.** Genotypic analyses show that 70–81% of mother-child pairs share identical or highly related S. mutans strains, indicating vertical transmission via saliva, often through behaviors such as sharing utensils or cleaning pacifiers with the mouth.[1-4] The American Academy of Pediatrics explicitly states that mothers are a primary source of S. mutans colonization for their children, and that vertical transmission is likely, especially in the context of active maternal dental decay.[5]

Colonization can occur as early as the predentate period, with 9–30% of infants showing S. mutans in the oral cavity by 1–6 months of age, and nearly all children colonized by 30 months.[3][6] High maternal salivary S. mutans levels and frequent inoculation events increase the risk of transmission.[6-7] The presence of matching genotypes is associated with increased risk and severity of early childhood caries.[8]

In summary, **vertical transmission of S. mutans from mother to child via saliva is common and epidemiologically significant**, with maternal oral health status and behaviors being key determinants of transmissibility and subsequent caries risk in children.[1-8]


1. Demonstration of Mother-to-Child Transmission of Streptococcus Mutans Using Multilocus Sequence Typing.
   Lapirattanakul J, Nakano K, Nomura R, et al.
   Caries Research. 2008;42(6):466-74. doi:10.1159/000170588.
2. Longitudinal Study of Transmission, Diversity, and Stability of Streptococcus Mutans and Streptococcus Sobrinus Genotypes in Brazilian Nursery Children.
   Klein MI, Flório FM, Pereira AC, Höfling JF, Gonçalves RB.
   Journal of Clinical Microbiology. 2004;42(10):4620-6. doi:10.1128/JCM.42.10.4620-4626.2004.
   ☆ Leading Journal
3. Transmission of Mutans Streptococci in Mother-Child Pairs.
   Damle SG, Yadav R, Garg S, et al.
   The Indian Journal of Medical Research. 2016;144(2):264-270. doi:10.4103/0971-5916.195042.
4. Mother-to-Child Transmission of Streptococcus Mutans: A Systematic Review and Meta-Analysis.
   da Silva Bastos Vde A, Freitas-Fernandes LB, Fidalgo TK, et al.
   Journal of Dentistry. 2015;43(2):181-91. doi:10.1016/j.jdent.2014.12.001.


Sierra Mist


Lot 211515
Exp Apr 30, 2018
PH2OH
www.PH2OH.com
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5




Caries Disease

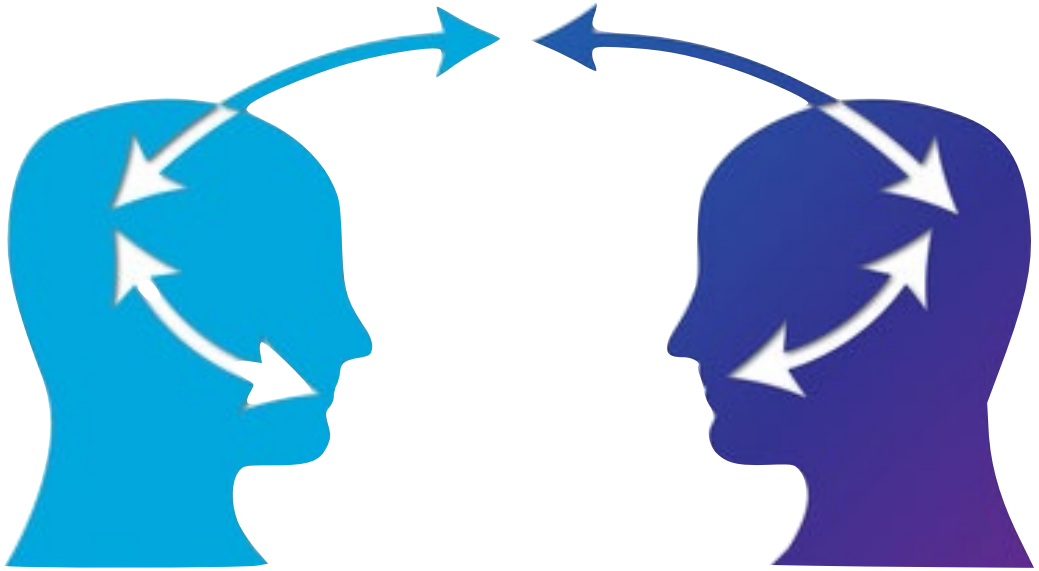
AWARENESS MONTH

# Hands-On
## LEARNING LAB

TM


# This is prevention

# Initiating a dialogue



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# PEDIATRIC ORAL AND SYSTEMIC HEALTH HISTORY

**While dentistry is our primary purpose, we believe children want a healthy mouth and a healthy body. Let us partner with them for both.**

Name _____ Date of Birth_____ Today's Date_____

Legal Guardian Name_____ Signature_____

What is your most important concern today?

## Medical Care:

*Does your child:*

Have special health care needs? Y N
Have any active medical conditions or disabilities? Y N
Have a history of complications during pregnancy or infancy? Y N
Avoid any recommended preventive services, including vaccinations? Y N
Have health goals you are trying to help him/her achieve? Y N

Who is your child's primary physician?

Do you wish your child was better cared for or that you were more trusting of your child's medical team? Y N

## Pharmacology:

List all medications your child is currently taking including prescription and OTC meds, vitamins and supplements:

Does your child have a history of antibiotic therapy for recurring infection(s)? Y N

## Allergies and/or Food Sensitivities

Are you aware of any allergies? Y N

If so, to what?

*Does your child:*

Have identified food sensitivities such as dairy, wheat, soy, or nuts? Y N
Eat foods that cause him/her to feel sluggish, hyperactive, or sick? Y N
Suffer from GI disturbances such as discomfort, bloating, constipation, or diarrhea? Y N
Have acid reflux or regurgitation? Y N
Have red, patchy or itchy skin or itchy ears? Y N
Get congested frequently? Y N
Exhibit an unhealthy weight (overweight or underweight)? Y N

## Exercise and Lifestyle:

*Does your child:*

Get less-than-daily physical exercise? Y N
Have more "screen time" than physical play time? Y N
Regularly consume processed foods or fast foods? Y N
Lack interest in exercise or athletics? Y N
Have concentration problems when not stimulated by electronics? Y N

## Behavior:

*Does your child:*

Have difficulties with communication? Y N
Have ongoing behavior challenges at home or in school? Y N
Have a diagnosis on the Autism spectrum? Y N

## Dental History:

Does your child have a history of fear, anxiety, or avoidance behavior at a medical/dental appointment? Y N

*Previous Dentist:*

Most recent dental visit:

Most recent x-rays:

Has your child seen an orthodontist? Y N

## Caries Disease (Tooth Decay):

*Does your child:*

Have primary care-givers with a history of adult decay? Y N
Snack more than twice a day between meals? Y N
Snack or drink anything other than water within an hour of bedtime? Y N
Sleep with a bottle? Y N
Consume sugary drinks including juice, soda, and/or sports drinks? Y N
Consume sugary foods such as crackers, breakfast cereals, chewy fruit snacks or candy? Y N
Have a history of tooth decay or an abscessed tooth? Y N



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## Fluoride:

*Does your child:*

Consumer water from:

- ☐ Tap (city) water
- ☐ Filtered tap water
- ☐ Well (country) water
- ☐ Bottled water

If not tap water, do you know the fluoride content of the water they drink? Y N
Take fluoride supplements? Y N
Receive professionally applied topical fluoride? Y N
Use tooth paste with fluoride? Y N

## Home Care:

*Does your child:*

Receive daily adult-assisted tooth brushing? Y N
Have skills to brush independently? Y N
Receive daily adult-assisted flossing? Y N
Have skills to floss independently? Y N
Have professionally applied sealants? Y N

## Sleep and Airway:

*Does your child:*

Snore or make breathing noises when sleeping? Y N
Have any history of strep throat, ear infections, or sinusitis? Y N
Breath with his/her mouth open? Y N
Experience bedwetting? Y N
Grind his/her teeth during sleep? Y N
Have ADHD-history, behavior disturbances or anxiety attacks? Y N
Experience any learning difficulties? Y N
Have oral habits such as finger, thumb or pacifier sucking? Y N
Have any "screen time" just before bed? Y N

## Dental and Facial Growth and Development:

*Does your child:*

Breathe through his/her mouth rather than nose? Y N
Have any oral habits such as fingers, thumb or pacifiers? Y N
Have a history of receiving breast milk or formula from a bottle rather than breast? Y N
Have a history of difficulty with latching? Y N
Have a tongue-tie or a lip-tie? Y N
Prefer a soft diet over harder-to-chew foods? Y N
Have any issues with speech or articulation of sounds such as "L" or "S"? Y N

## Function/Bite/TMJ Dysfunction:

*Does your child:*

Have difficulty with tooth eruption? Y N
Have foods that are difficult to chew? Y N
Choke or gag on foods not chewed well? Y N
Have extra, missing or fused teeth? Y N
Have clicking, popping or pain in either jaw joint? Y N

## Aesthetics:

Are there any cranial, facial, or dental abnormalities that concern you? Y N
Are there any tooth discolorations that concern you? Y N
Are there any tooth size or tooth position discrepancies that concern you? Y N

## Tooth Eruption:

Child's age (in months) when first tooth erupted? _____
Has your child experienced teething or eruption problems? Y N

## Injury Prevention and Trauma:

Are there areas in your home that are not considered child proof? Y N
Has your child had an oral/facial injury? Y N

**Is there anything else you would like us to know?**

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Regularly consume processed foods or fast foods?..... Y N
Lack interest in exercise or athletics? ..... Y N
Have concentration problems when not stimulated by electronics? ..... Y N

## Behavior:

*Does your child:*

Have difficulties with communication?..... Y N
Have ongoing behavior challenges at home or in school? ..... Y N
Have a diagnosis on the Autism spectrum?..... Y N

## Dental History:

Does your child have a history of fear, anxiety, or avoidance behavior at a medical/dental appointment? ..... Y N

*Previous Dentist:*

Most recent dental visit:

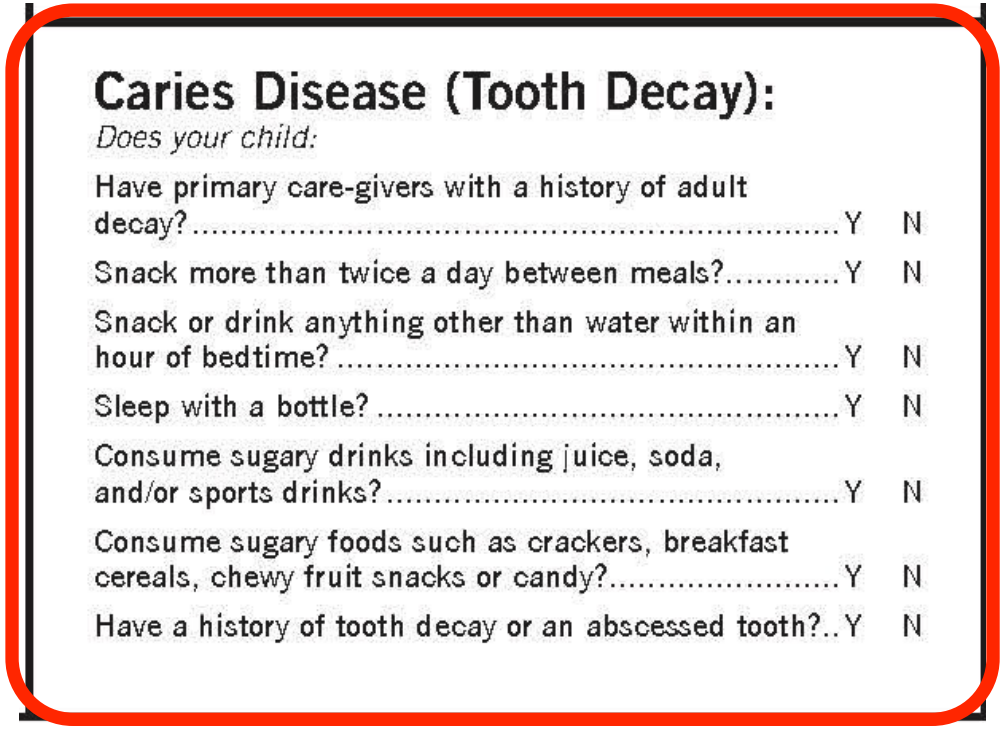
Most recent x-rays:

## Caries Disease (Tooth Decay):

*Does your child:*

Have primary care-givers with a history of adult decay?..... Y N
Snack more than twice a day between meals?..... Y N
Snack or drink anything other than water within an hour of bedtime? ..... Y N
Sleep with a bottle? ..... Y N
Consume sugary drinks including juice, soda, and/or sports drinks?..... Y N
Consume sugary foods such as crackers, breakfast cereals, chewy fruit snacks or candy?..... Y N
Have a history of tooth decay or an abscessed tooth?.. Y N





# Open-Ended vs. Binary Questions

**Open-ended questions** are generally more effective than binary yes-no questions for facilitating health behavior change. Open-ended questions encourage patients to elaborate on their thoughts, motivations, and barriers, fostering greater engagement and self-reflection. This approach is central to motivational interviewing and patient-centered counseling, which have been shown to improve confidence and success in changing health behaviors. The American Heart Association specifically recommends the use of open-ended questions and reflective listening as core strategies in behavior change counseling, emphasizing that these techniques help patients assume responsibility for their own health and support the development of actionable plans.[1]

Open Evidence


1. Better Population Health Through Behavior Change in Adults: A Call to Action.
   Spring B, Ockene JK, Gidding SS, et al.
   Circulation. 2013;128(19):2169-76. doi:10.1161/01.cir.0000435173.25936.e1.
   Practice Guideline ☆ Leading Journal
2. Community Connections Linking Primary Care Patients to Local Resources for Better Management of Obesity.
   Elizabeth E. Stewart PhD MBA, Neta Taylor-Post HBOR BA, Laura Nichols MS, Elizabeth W. Staton MSTC, Andrew Schleuning BS
   Agency for Healthcare Research and Quality (2014)
   Practice Guideline
3. Integrating Primary Care Practices and Community-based Resources to Manage Obesity.
   Paul McGinnis M.P.A., Melinda M. Davis Ph.D., Sonya Howk M.P.A. H.A., Molly DeSordi B.A., Michelle Thomas M.S.W
   Agency for Healthcare Research and Quality (2014)
   Practice Guideline
4. Using the Question-Behavior Effect to Change Multiple Health Behaviors: An Exploratory Randomized Controlled Trial.
   Wilding S, Conner M, Prestwich A, Lawton R, Sheeran P.
   Journal of Experimental Social Psychology. 2019;81:53-60. doi:10.1016/j.jesp.2018.07.008.

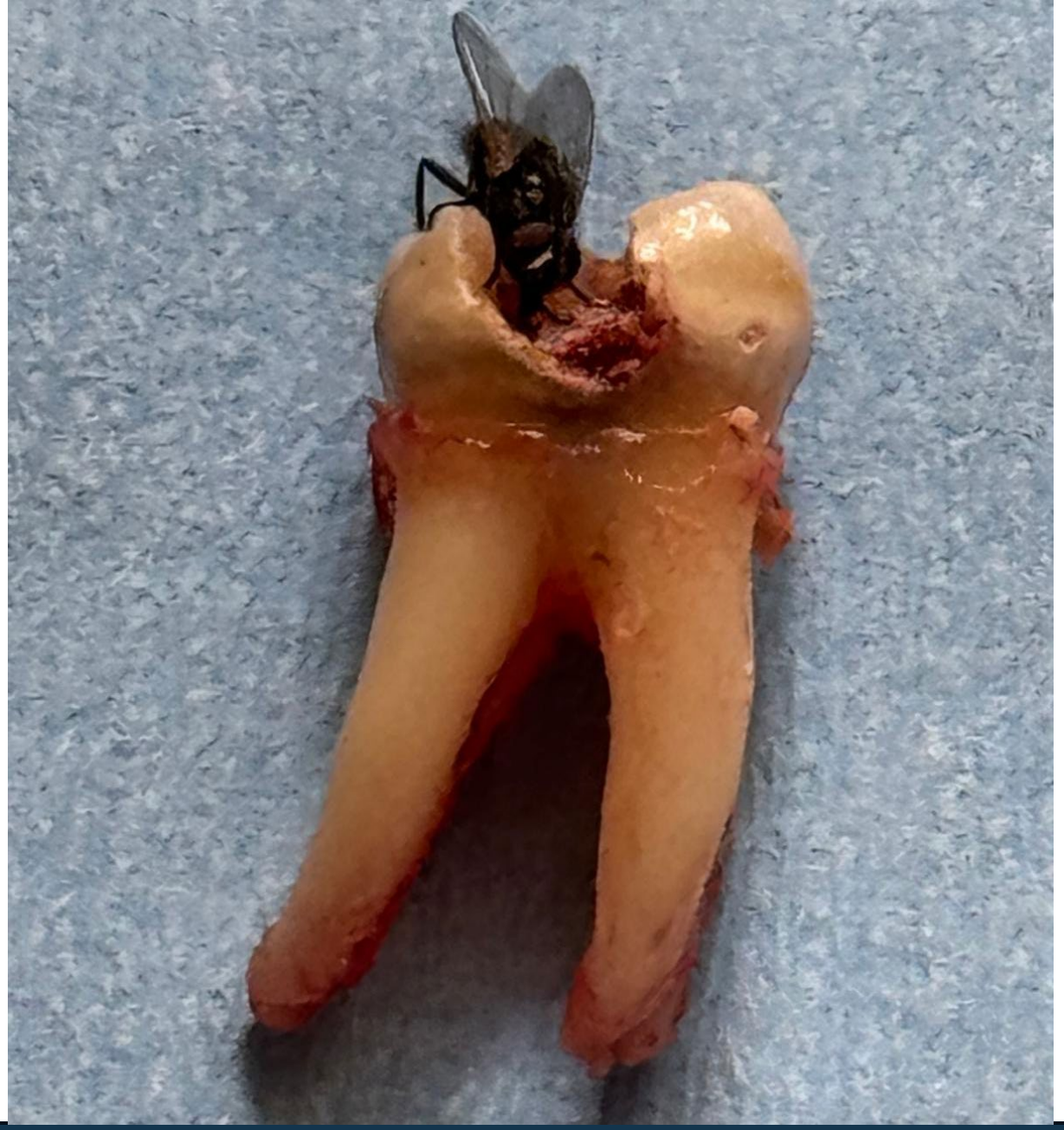

TELL ME
WHAT YOU
KNOW
ABOUT THIS
DISEASE

# Should activates resistance


Should activates resistance for ALL of us!

**Caries Disease**

AWARENESS MONTH



Caries Disease

AWARENESS MONTH


**Caries Disease**

AWARENESS MONTH


# Hands-On LEARNING LAB™

**Caries Disease**

AWARENESS MONTH


# Hands-On LEARNING LAB™

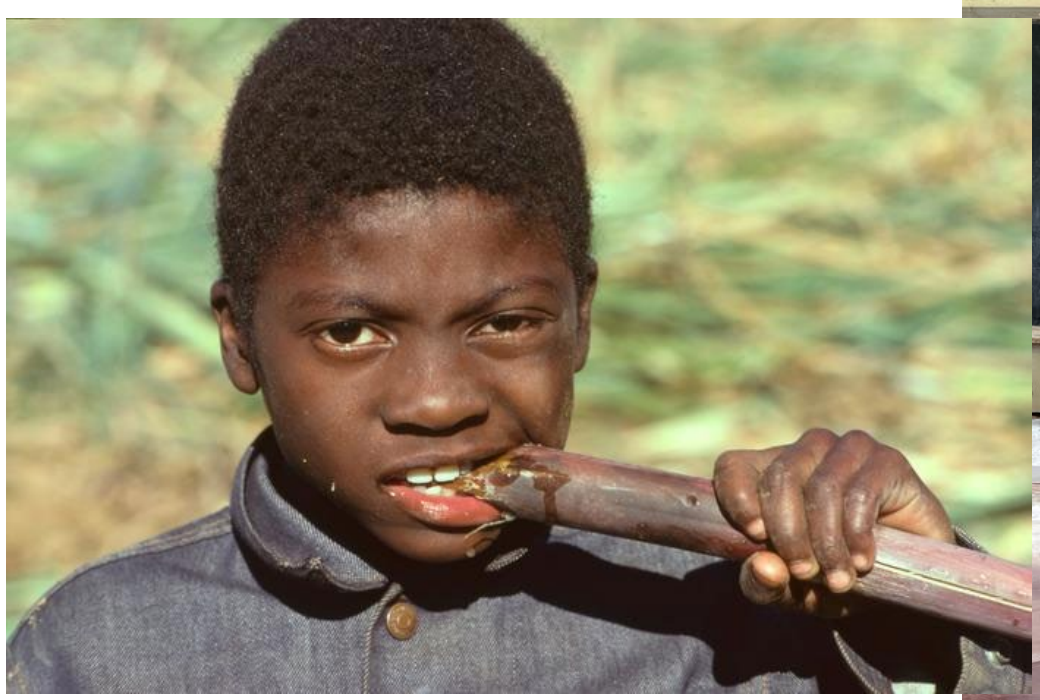
This is prevention


# Hands-On LEARNING LAB™

**Caries Disease**

AWARENESS MONTH


WHAT DO YOU
BELIEVE?



# Caries Disease

AWARENESS MONTH

Stay *curious*
and ask open-ended questions

*Follow their lead*

Be *open* to outcome, not attached to it


There’s No Such Thing As
Other Peoples’ Children!

# Other sources of acid?

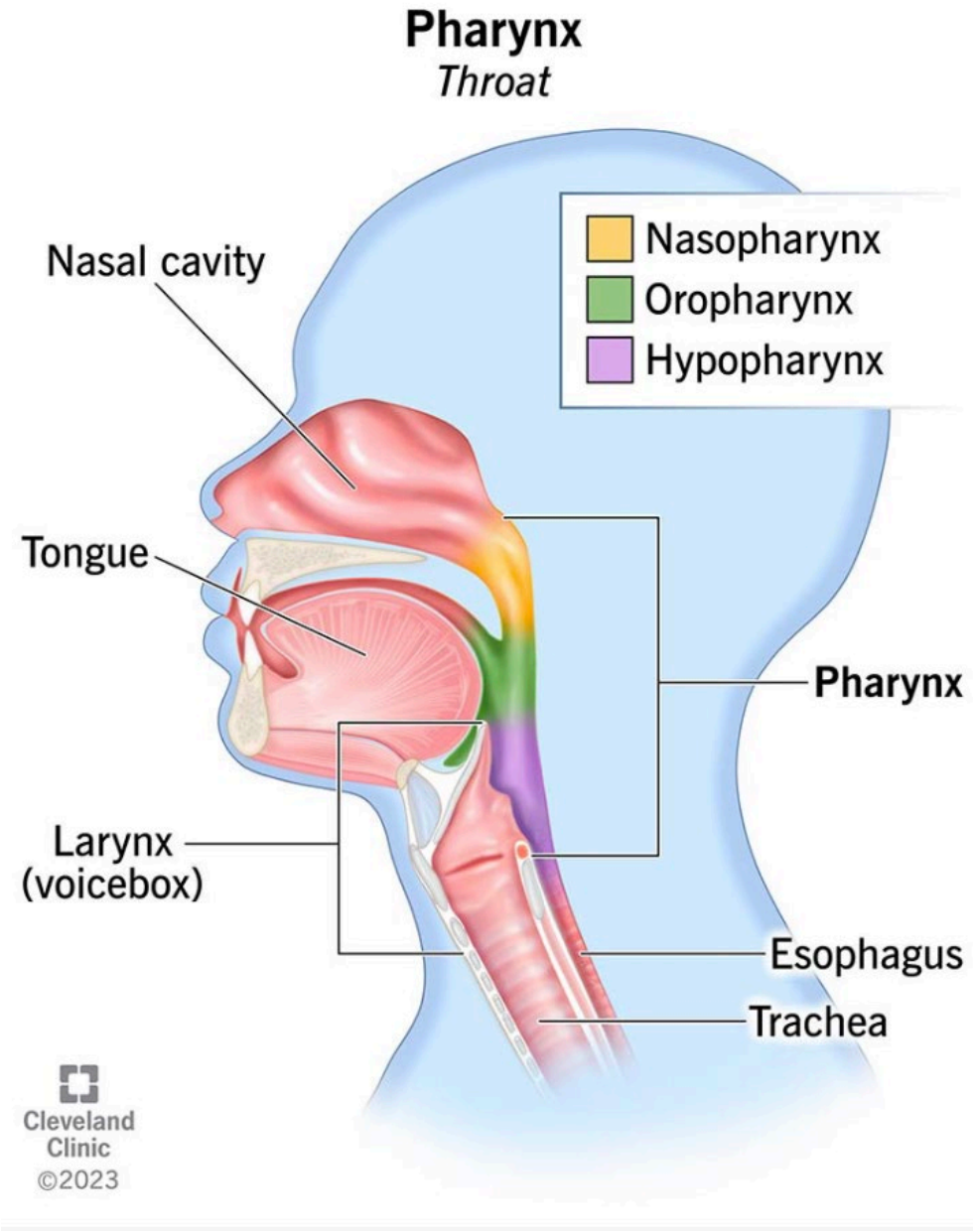
# Acid Reflux

## (AKA Airway Reflux)

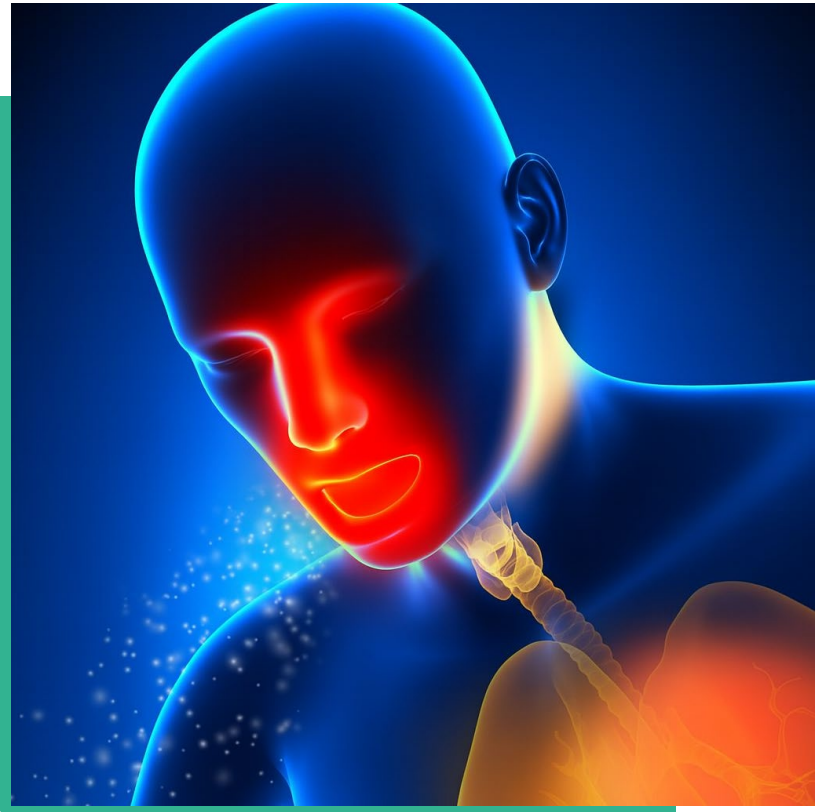
**60%** US adults report some reflux

**20-30%** ...at least weekly

# Consider The Space



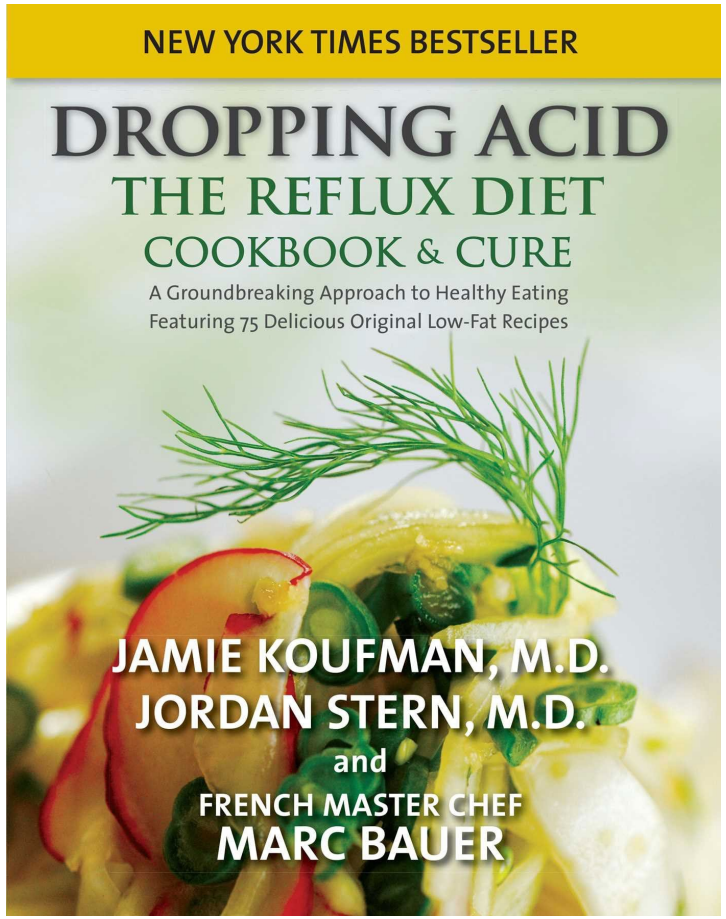
# The *Silent* Factors of Airway Reflux



- Enamel Erosion
- Active Caries
- Hoarse voice
- Post nasal drip
- Throat Clearing
- Chronic cough
- A lump in the throat
- Indigestion, burping, bloating, nausea

# Definition of “Airway Reflux” aka “Respiratory Reflux”:

Dr. Koufman uses **“airway reflux,”** also known as **“respiratory reflux” (RR)** or **laryngopharyngeal reflux (LPR)**, to refer to the **backflow of stomach contents up into the throat, voice box, and respiratory tract**—not just the esophagus. This condition often lacks the typical heartburn, so she favors the term “airway reflux” to highlight its impact on the airways.

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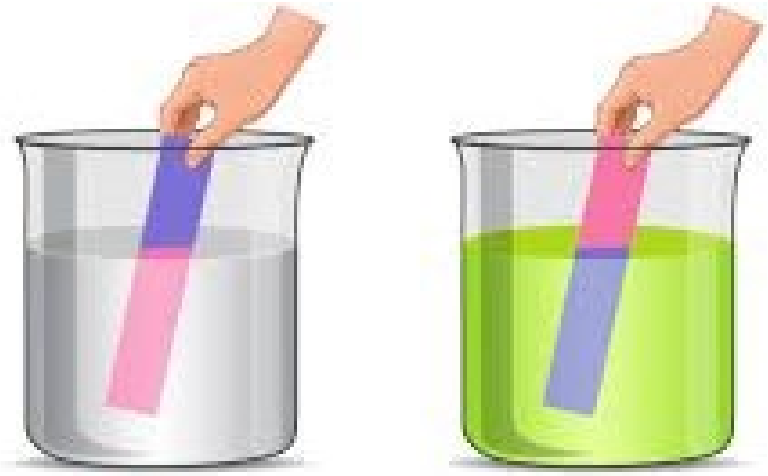
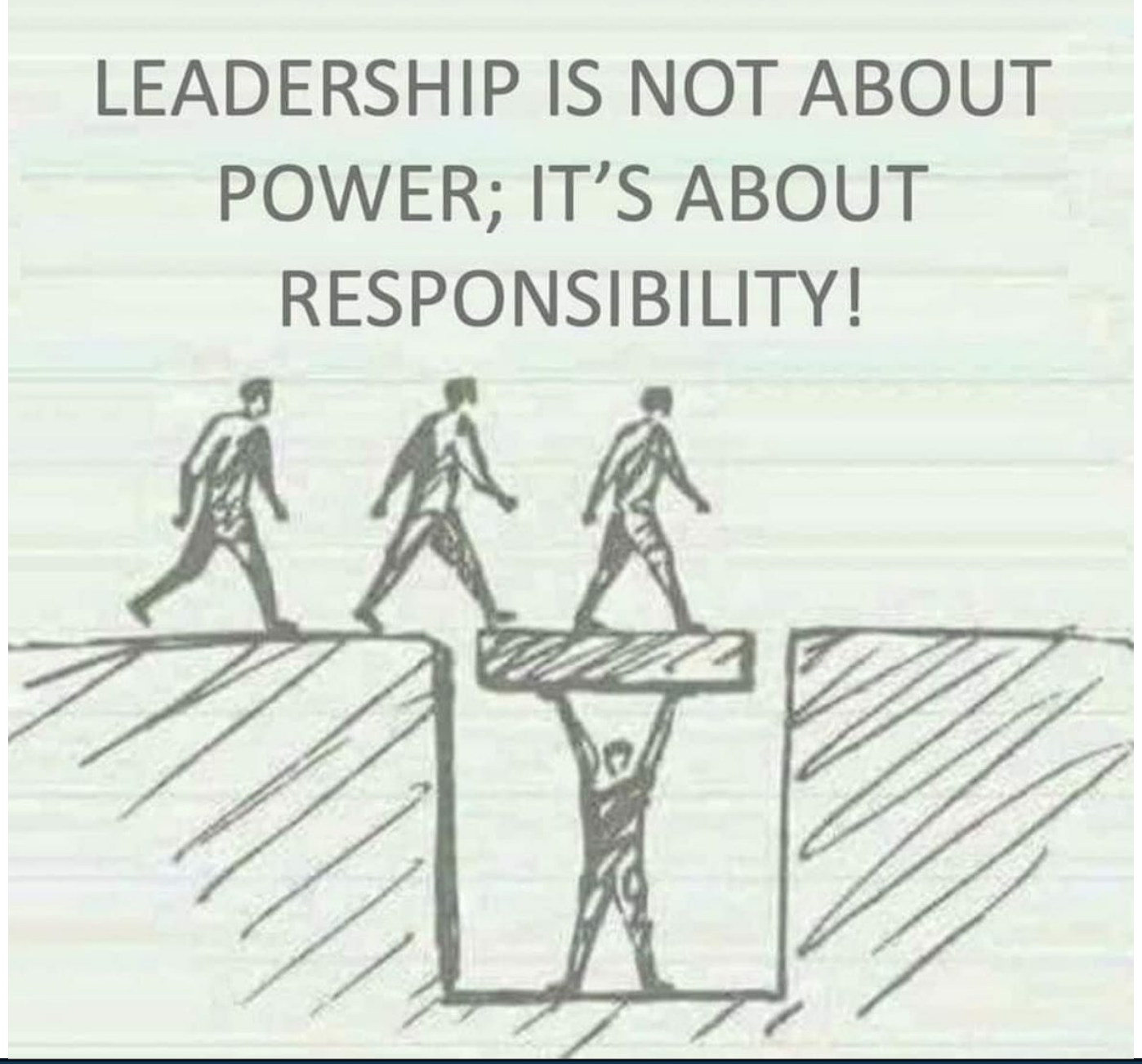


**Caries Disease**

AWARENESS MONTH

Would you have these conversations even though…….

……. You know you’re not getting paid for your time?

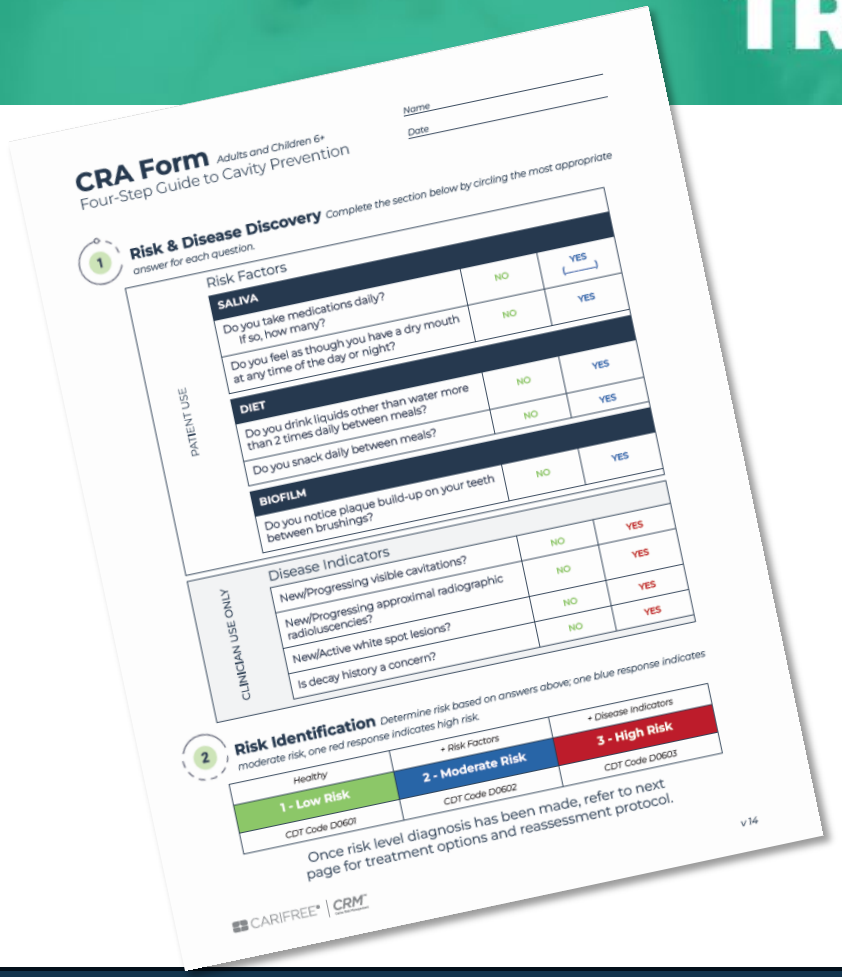

LEADERSHIP IS NOT ABOUT
POWER; IT'S ABOUT
RESPONSIBILITY!


Susan@DrSusanMaples.com
(517) 819 6330
For supplemental course materials:

Caries Disease

AWARENESS MONTH

# SPARK CONVERSATIONS, TRANSFORM SMILES



CRA Form Adults and Children 6+

Four-Step Guide to Cavity Prevention

Name

Date

1 Risk & Disease Discovery Complete the section below by circling the most appropriate answer for each question.

PATIENT USE

| Risk Factors | | |
|---|---|---|
| **SALIVA** | | YES |
| Do you take medications daily? If so, how many? | NO | |
| Do you feel as though you have a dry mouth at any time of the day or night? | NO | YES |
| **DIET** | | |
| Do you drink liquids other than water more than 2 times daily between meals? | NO | YES |
| Do you snack daily between meals? | NO | YES |
| **BIOFILM** | | |
| Do you notice plaque build-up on your teeth between brushings? | NO | YES |

CLINICIAN USE ONLY

| Disease Indicators | | |
|---|---|---|
| New/Progressing visible cavitations? | NO | YES |
| New/Progressing approximal radiographic radiolucencies? | NO | YES |
| New/Active white spot lesions? | NO | YES |
| Is decay history a concern? | NO | YES |

2 Risk Identification Determine risk based on answers above; one blue response indicates moderate risk, one red response indicates high risk.

| Healthy | + Risk Factors | + Disease Indicators |
|---|---|---|
| 1 - Low Risk | 2 - Moderate Risk | 3 - High Risk |
| CDT Code D0601 | CDT Code D0602 | CDT Code D0603 |

Once risk level diagnosis has been made, refer to next page for treatment options and reassessment protocol.

v 14

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## GET INVOLVED!

Download Your FREE Caries Risk Toolkit Today.

www.cariesdisease.com

Caries Disease

AWARENESS MONTH