



WELCOME to the

Pediatric Oral Health ECHO:
Emerging Role of Silver Diamine Fluoride for Early
Childhood Caries in Primary Care

Series Learning Objectives

After participating in this activity, learners will be able to:

- Develop proficiency and confidence in conducting pediatric oral health assessments utilizing assessment tools.
- Outline the characteristics of Silver Diamine Fluoride (SDF), the criteria for its application, the implementation process, and education strategies for parents and patients.
- Identify dental caries lesions in pediatric patients.

Curriculum

- [Session 1 - Pediatric Oral Health Assessment: Identify ECC in Your Patients](#)
- [Session 2 - Emerging Opportunities: Use of Silver Diamine Fluoride in Early Childhood Caries](#)
- Session 3 – Integrating Silver Diamine Fluoride into your Practice



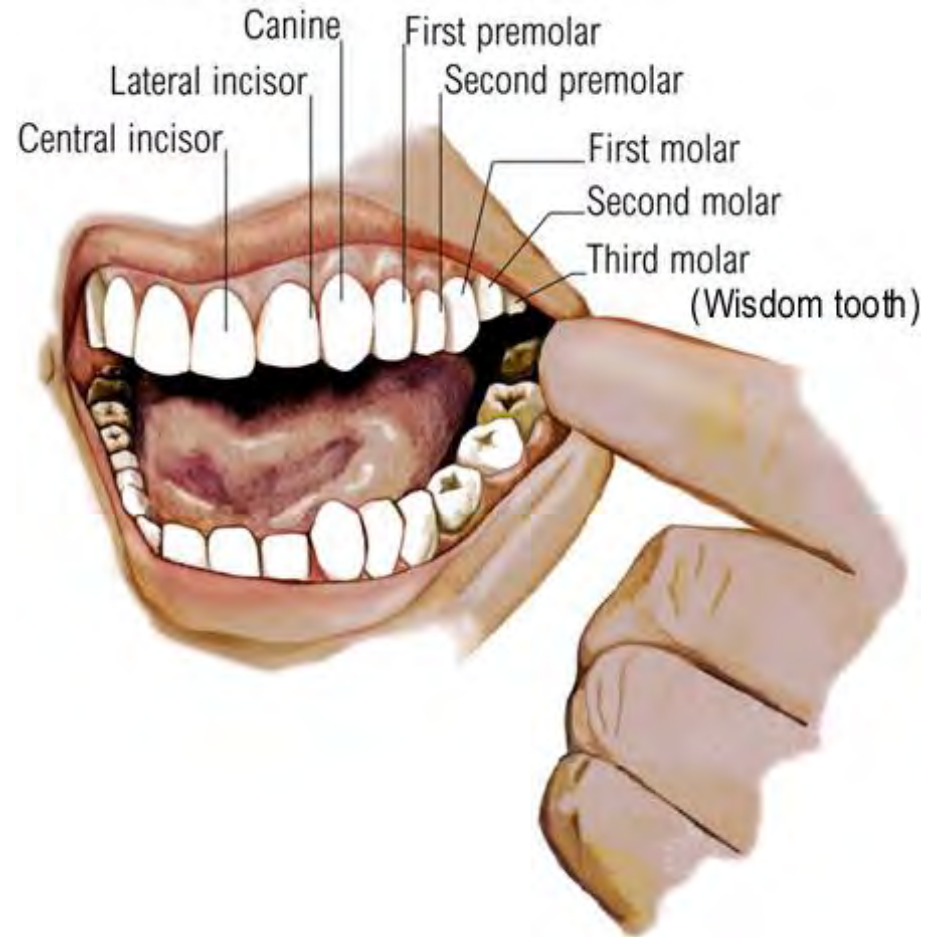
Putting the Mouth Back in the Body: Oral Health and the Pediatrician

Steven H. Chapman M.D.

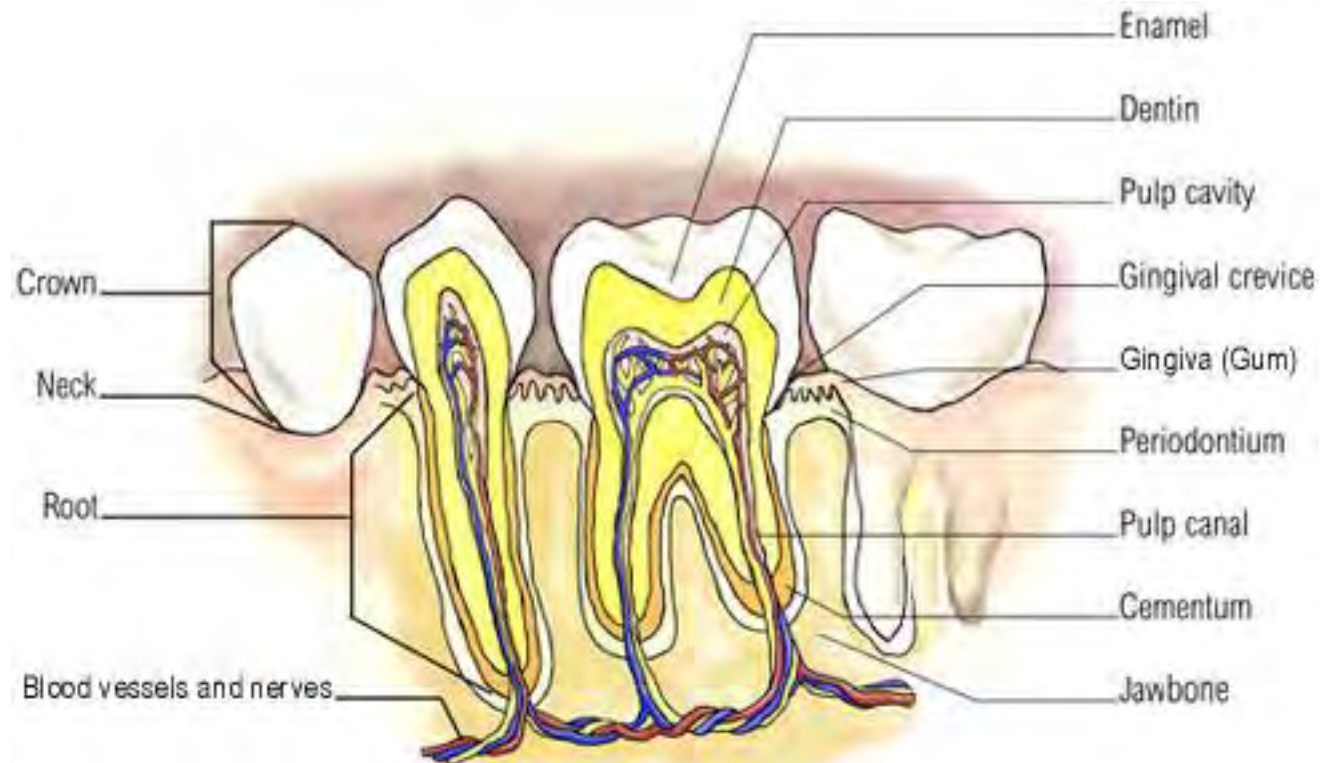
Boyle Chair of Community Advocacy

Dartmouth Health Children's

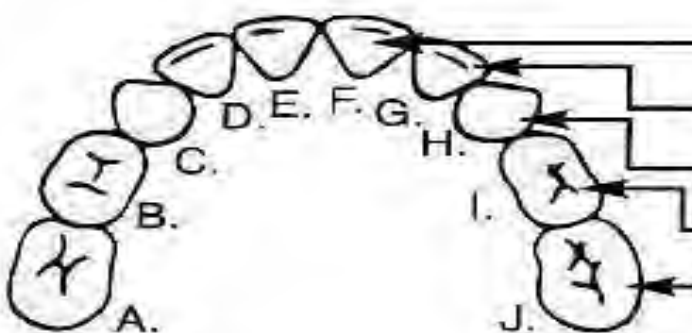
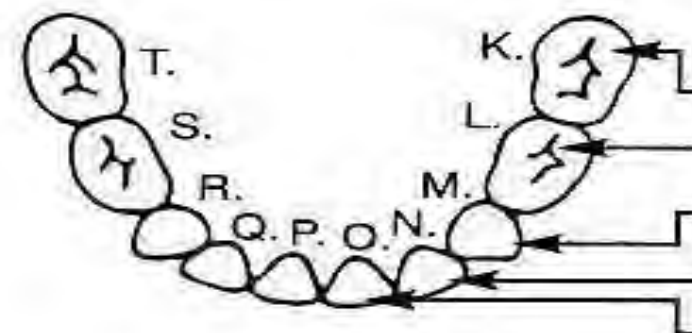
The Names of the Teeth



The Tooth



PRIMARY DENTITION

	Upper Teeth	Erupt	Exfoliate
	Central incisor	8-12 months	6-7 years
	Lateral incisor	9-13 months	7-8 years
	Canine (cuspid)	16-22 months	10-12 years
	First molar	13-19 months	9-11 years
	Second molar	25-33 months	10-12 years
	Lower Teeth	Erupt	Exfoliate
	Second molar	23-31 months	10-12 years
	First molar	14-18 months	9-11 years
	Canine (cuspid)	17-23 months	9-12 years
	Lateral incisor	10-16 months	7-8 years
	Central incisor	6-10 months	6-7 years

Primary Dentition

8 incisors + 4 canines + 8 molars = 20 by age 3

Primary Tooth Eruption



Age 1



Age 3

AAP Oral Risk Assessment Tool

American Academy of Pediatrics Oral Health Risk Assessment Tool

The American Academy of Pediatrics (AAP) developed this tool to aid in the implementation of oral health risk assessment during health supervision visits. Since a validated caries risk assessment tool does not currently exist, this tool includes factors known to be related to childhood caries. The form provides a framework to assist the pediatric clinician to identify risk as well as modifiable behaviors to optimize patient oral health.

Instructions for Use

Use this form in conjunction with the **AAP Oral Health Intake Form**, to collect information from parents/caregivers on home care and habits that contribute to both protective and risk factors. That information will help inform the **Action Plan** and the family's **Self-Management Goals**. The child is at high risk for caries if any of the risk factors below are reported or found in the physical exam. In the presence of multiple risk factors or severe clinical findings, the clinician may determine the child should be seen by a dentist as soon as possible.

Patient Name: _____ Date of Birth: _____ Date: _____

Visit: 6 month 9 month 12 month 15 month 18 month 24 month 30 month 3 year 4 year 5 year 6 year Other

RISK FACTORS

- | | | |
|--|--|---|
| Mother or primary caregiver had active decay in the past 12 months
<input type="checkbox"/> Yes <input type="checkbox"/> No | Frequent snacking on sugary and/or sticky snacks
<input type="checkbox"/> Yes <input type="checkbox"/> No | Medicaid eligible
<input type="checkbox"/> Yes <input type="checkbox"/> No |
| Does not have an established dental home
<input type="checkbox"/> Yes <input type="checkbox"/> No | Has not received fluoride varnish in the last 6 months
<input type="checkbox"/> Yes <input type="checkbox"/> No | Special health care needs
<input type="checkbox"/> Yes <input type="checkbox"/> No |
| Continual bottle/sippy cup use with beverage other than water
<input type="checkbox"/> Yes <input type="checkbox"/> No | Does not have teeth brushed twice daily
<input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Does not drink fluoridated water or take fluoride supplements
<input type="checkbox"/> Yes <input type="checkbox"/> No | Does not use fluoride toothpaste
<input type="checkbox"/> Yes <input type="checkbox"/> No | |

PHYSICAL FINDINGS

- | | | |
|--|---|--|
| Obvious decay
<input type="checkbox"/> Yes <input type="checkbox"/> No | White spots or decalcifications
<input type="checkbox"/> Yes <input type="checkbox"/> No | Visible plaque
<input type="checkbox"/> Yes <input type="checkbox"/> No |
| Restorations present (Fillings or Silver Diamine Fluoride Present)
<input type="checkbox"/> Yes <input type="checkbox"/> No | Swollen or bleeding gums (gingivitis)
<input type="checkbox"/> Yes <input type="checkbox"/> No | |

Oral Health Risk Determination: If YES to any of the above, this patient is considered **HIGH** risk for dental disease. Determine **HIGH** / **LOW** risk; follow **Action Plan** below.

ACTION PLAN

- | | | | | | | | | | | | | | |
|--|---|------------------|-----------------|---|---|------------------------------|------------------------------|--|--|------------------|-----------------|------------------------------|------------------------------|
| Apply fluoride varnish
Refer to a dental home | <table border="0"> <tr> <td>High Risk</td> <td>Low Risk</td> </tr> <tr> <td><input type="checkbox"/> Every 3 months</td> <td><input type="checkbox"/> Every 6 months</td> </tr> <tr> <td><input type="checkbox"/> Yes</td> <td><input type="checkbox"/> Yes</td> </tr> </table> | High Risk | Low Risk | <input type="checkbox"/> Every 3 months | <input type="checkbox"/> Every 6 months | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | Set self-management goals with caregiver | <table border="0"> <tr> <td>High Risk</td> <td>Low Risk</td> </tr> <tr> <td><input type="checkbox"/> Yes</td> <td><input type="checkbox"/> Yes</td> </tr> </table> | High Risk | Low Risk | <input type="checkbox"/> Yes | <input type="checkbox"/> Yes |
| High Risk | Low Risk | | | | | | | | | | | | |
| <input type="checkbox"/> Every 3 months | <input type="checkbox"/> Every 6 months | | | | | | | | | | | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | | | | | | | | | | | | |
| High Risk | Low Risk | | | | | | | | | | | | |
| <input type="checkbox"/> Yes | <input type="checkbox"/> Yes | | | | | | | | | | | | |

SELF-MANAGEMENT GOALS

- Reviewed
- Brush twice daily with fluoride toothpaste.
 - Regular dental visits for child and caregiver(s).
 - Wean off bottle and use only water in sippy cup
 - Less/no juice. No soda.
 - Drink fluoridated water.
 - Less/no junk food or candy. Replace with healthy snacks.
 - Have teeth treated with fluoride varnish every 3-6 months.

COMPLETED ACTIONS

- | | | |
|------------------------------|------------------------------|-----------------------------|
| Oral health risk assessment | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Visual exam of the mouth | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Fluoride varnish application | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Anticipatory guidance | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Referral to a dentist | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

MANAGEMENT OF HIGH RISK CHILDREN

High-risk children should receive professionally applied fluoride varnish. Caregivers should be counseled to brush teeth twice daily with an age-appropriate amount of fluoridated toothpaste. Referral to a pediatric dentist or a dentist comfortable caring for children should be made with follow-up to ensure that the child is being cared for in the dental home.

Oral Health Risk Assessment Tool Guidance

Timing of Risk Assessment

The Bright Futures/AAP "Recommendations for Preventive Pediatric Health Care" (i.e. Periodicity Schedule) recommends all children receive a risk assessment at the 6- and 9-month visits. For the 12-, 18-, 24-, 30-month, and the 3- and 6-year visits, risk assessment should continue if a dental home has not been established. View the Bright Futures/AAP Periodicity Schedule: <https://brightfutures.aap.org/clinical-practice/Pages/default.aspx>.



Major Risk Factors

Maternal Oral Health

Studies have shown that children with mothers or primary caregivers who have had active decay in the past 12 months are at greater risk to develop caries.

Continual Bottle/Sippy Cup Use

Children who drink juice, soda, and other liquids that are not water, from a bottle or sippy cup continually throughout the day or at night are at an increased risk of caries. The frequent intake of sugar does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor should be counseled on how to reduce the frequency of sugar-containing beverages in the child's diet.

Frequent Snacking

Children who snack frequently are at an increased risk of caries. The frequent intake of sugar/refined carbohydrates does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor should be counseled on how to reduce frequent snacking and choose healthy snacks such as cheese, vegetables, and fruit. The family's ability to access healthy food should be discussed and addressed, if needed.

Special Health Care Needs

Children with special health care needs are at an increased risk for caries due to their diet, xerostomia (dryness of the mouth, sometimes due to asthma or allergy medication use), difficulty performing oral hygiene, seizures, gastroesophageal reflux disease and vomiting, attention deficit hyperactivity disorder, and gingival hyperplasia or overcrowding of the teeth. Premature babies also may experience enamel hypoplasia. These children should be referred to a pediatric dentist for skilled care in addressing these complex issues.

Protective Factors

Dental Home

According to the American Academy of Pediatric Dentistry (AAPD), the dental home is oral health care for the child that is delivered in a comprehensive, continuously accessible, coordinated and family-centered way by a licensed dentist. The AAP and the AAPD recommend that a dental home be established by age 1. Communication between the dental and medical homes should be ongoing to appropriately coordinate care for the child. If a dental home is not available, the pediatrician should continue to do oral health risk assessment at every well-child visit.

Fluoride Varnish in the Last 6 Months

Applying fluoride varnish provides a child with highly concentrated fluoride to protect against caries. Fluoride varnish may be professionally applied. For online fluoride varnish training, access the Caries Risk Assessment, Fluoride Varnish, and Counseling Module in the Smiles for Life National Oral Health Curriculum: <https://www.smilesforlife.org/courses/caries-risk-assessment-fluoride-varnish-and-counseling>

Fluoridated Water/Supplements

Drinking fluoridated water provides a child with systemic and topical fluoride exposure, a proven caries reduction intervention. Fluoride supplements may be prescribed by the pediatrician or dentist if needed. View fluoride resources on the AAP Campaign for Dental Health website: <https://likemyteeth.org/health-professionals>

Toothbrushing and Oral Hygiene

Pediatricians can reinforce good oral hygiene by teaching parents and children simple practices. Infants should have their mouths cleaned after feedings with a wet soft washcloth. Once teeth erupt it is recommended that children have their teeth brushed twice a day with fluoride toothpaste. The child's teeth should be brushed twice a day as soon as the teeth erupt with a smear or a grain-of-rice-sized amount of fluoridated toothpaste. After the third birthday, a pea-sized amount of fluoridated toothpaste should be used.

Physical Findings



Obvious Decay

Tooth decay is the decomposition of the tooth structure due to acid caused by bacteria and can appear on any surface of the tooth. Decay can range in color from yellow to black. When obvious decay is present, the child should be considered high risk and referred for immediate dental care.



Restorations Present (Fillings or Silver Diamine Fluoride Present)

Restorations indicate that decay occurred and was treated. Restorations can present as materials such as silver diamine fluoride, metal, alloy, plastic, glass ionomer, or porcelain. A child who has been treated for decay is at continued risk and should be under the regular care and supervision of a dental professional.



White Spots / Decalcifications

Decalcification is an early sign of tooth decay, takes the form of white spots on the teeth, and commonly presents along the gum line. Remineralization can be achieved with fluoride, in particular application of fluoride varnish. When calcifications are present, the child should be considered high risk and referred for immediate dental care.



Swollen or Bleeding Gums (Gingivitis)

Gingivitis is the inflammation of the gums. Pediatricians can teach patients and their families good oral hygiene skills to reduce inflammation.



Visible Plaque

Plaque is the soft and sticky substance that accumulates on the teeth from food debris and bacteria. Pediatricians can teach parents to remove plaque from the child's teeth by brushing and flossing.



Healthy Teeth

Children with healthy teeth have no signs of early childhood caries and no other clinical findings. They are also experiencing normal tooth and mouth development and spacing. Apply fluoride varnish if child has not received treatment in prior six months.

For more information about the AAP's oral health activities and resources, email oralhealth@aap.org or visit www.aap.org/oralhealth.

The recommendations in this publication do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate. Inclusion in this resource does not imply an endorsement by the American Academy of Pediatrics (AAP). The AAP is not responsible for the content of the resources mentioned in this resource. Website addresses are as current as possible but may change at any time. The American Academy of Pediatrics (AAP) does not review or endorse any modifications made to this resource and in no event shall the AAP be liable for any such changes. © 2023 American Academy of Pediatrics. All rights reserved.

Early Childhood Caries

Why This Topic?

- Prevalence:
 - 30-50% of low income children
 - As high as 70% in Native American populations
- 80% of decay occurs in 20% of children
- Most common chronic disease in children
 - 5 times more common than asthma
 - 7 times more common than hay fever
 - 51 Million School Hours Lost/Year

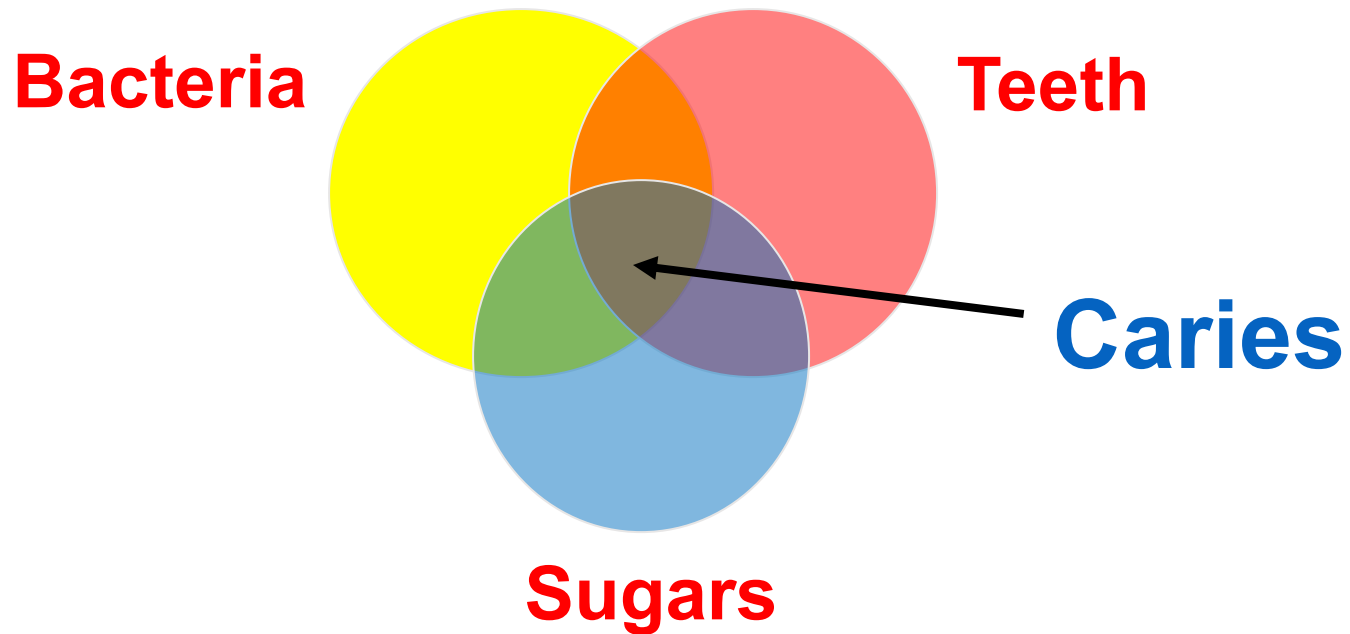
Early Childhood Caries

Why This Topic?

- Most Common Disease of Childhood
 - 8% of 1-yr-olds
 - 22% of 2-yr-olds
 - 35% of 3-yr-olds
- 1 in 5 2nd graders have current or past rampant decay
- Significant adult complications

Etiology Triad

Oral **bacteria** (*Mutans Strep*) break down dietary **sugars** into acids which eat away the **tooth**



Streptococcus mutans Transmission



ECC Risk Factors

- SES and cultural factors
- Caries in child, siblings or caretakers
- Special healthcare needs
- Frequent feeding/snacks
- Enamel defects
- Inadequate fluoride



White Spots: First Sign of Caries



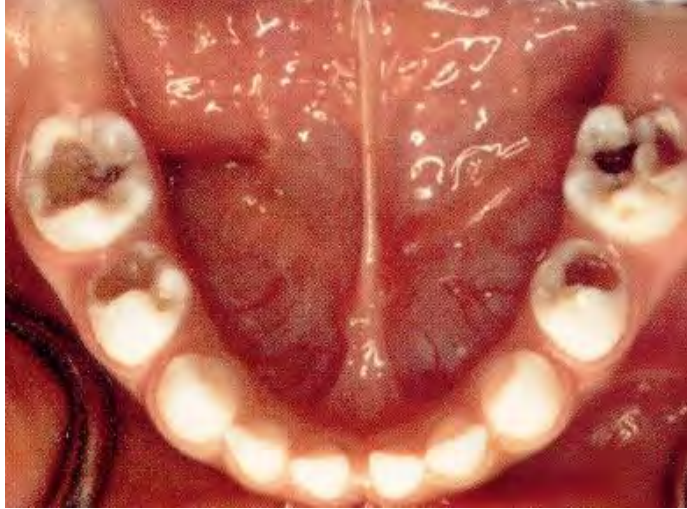
Early Caries



Moderate Caries



Severe Caries



● Toothbrushing should begin...



with the eruption of
the first tooth

Diet And Feeding 0-12 Months

- Hold infant for bottle and breast feedings
- No bottles at bedtime or nap
- No sweetened pacifiers
- Introduce cup at 6 months, wean bottle by 12 months
- Fluoride Rx at 6 months if not in water supply
- Avoid cariogenic snacks between meals

Diet And Feeding 1-2 Years

- Discontinue bottle by 12 months
- Avoid ad lib use of sippy cup unless it contains water
- Avoid excessive juice
- Limit cariogenic snacks between meals
- Reserve soda, candy and sweets for special occasions

Diet And Feeding 2-5 Years

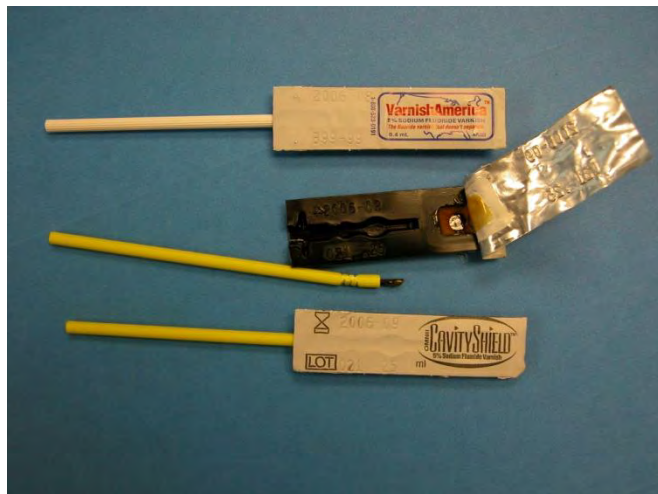
- Avoid excessive juice
- Choose fresh fruits, vegetables, or whole grain snacks
- Limit cariogenic snacks between meals
- Reserve soda, candy and sweets for special occasions

Fluoride Mechanism

- Inhibits demineralization
- Enhances remineralization
- Inhibits bacterial metabolism
- Decreases bacterial acid production
- Has both systemic and topical mechanisms of action

Fluoride Varnish

Safe
OK for infants/ toddlers
Easy to use
Effective
Reimbursed CPT Code 99188



Silver Diamine Fluoride

- Arrests development of caries
- Alternative to extraction or filling under general anesthesia
- Topical treatment applied in dentist offices, some school settings
- New frontier for pediatric medical homes
- New CPT Code 0792T



Silver Diamine Fluoride

Tracy Towers, RDH

Dental Hygienist, Winooski School District



Silver Diamine Fluoride



Silver diamine fluoride is a colorless or blue-tinted liquid, which is comprised of approximately 25% silver, 5% fluoride and 8.0% ammonia

It is sold in the United States by Elevate Oral Health as Advantage Arrest



2016 The FDA granted Advantage Arrest, Elevate Oral Care its **Breakthrough Therapy Designation** for use in arresting dentinal caries in children and adults.

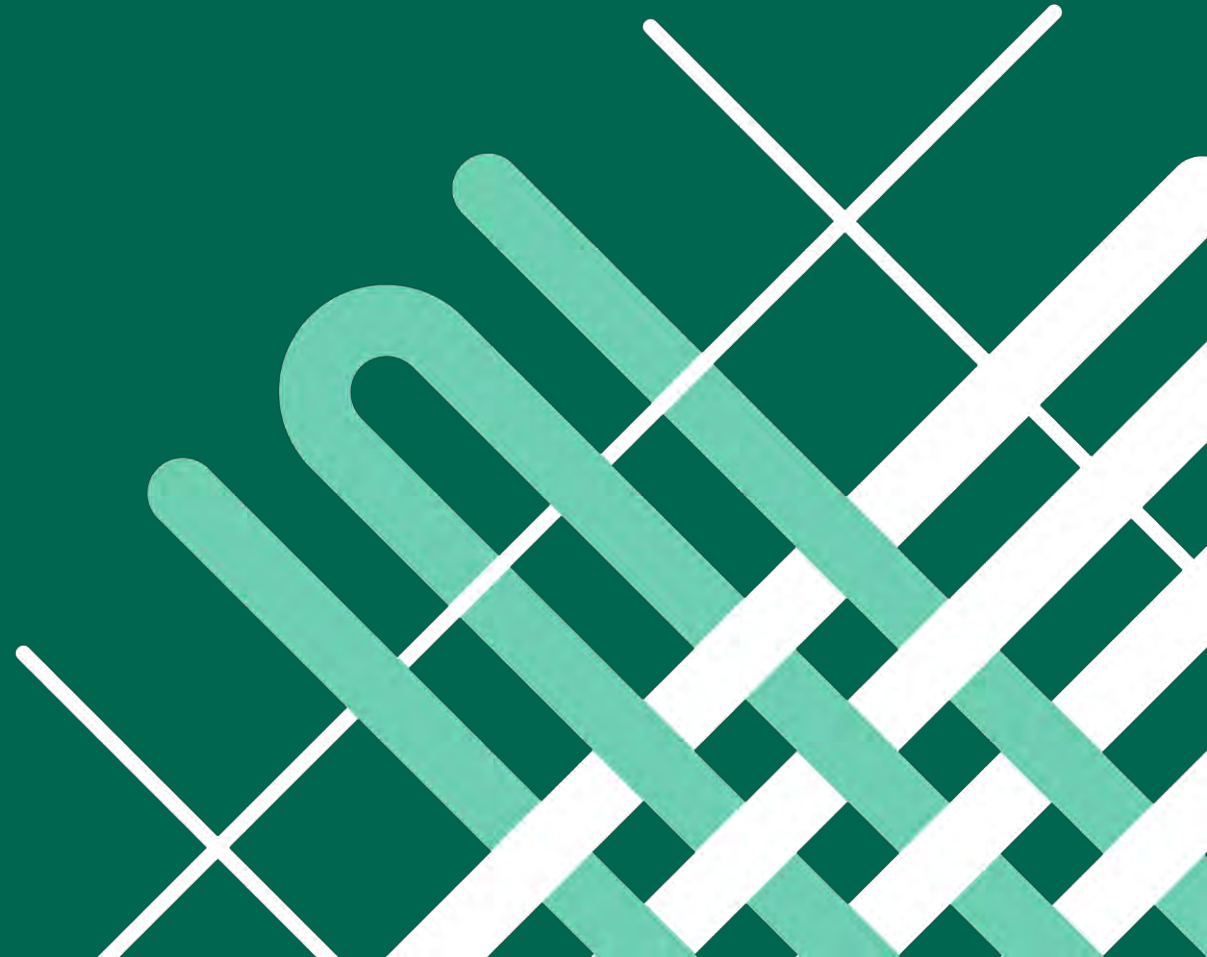
“The breakthrough therapy designation represents the agency’s effort to expedite the development and review of drugs that are intended to treat a serious condition; it is granted when preliminary clinical evidence indicates the drug may demonstrate substantial improvement over available therapies” (fda.gov)

History of SDF:

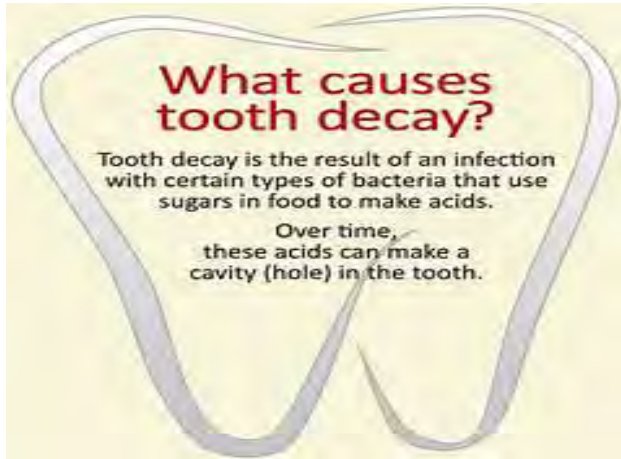
- Approved for use as a therapeutic again in Japan in the 1960's (Yamaga R, Yokomizo 1969)
- Used in the 1970s in Japan during a surge in childhood caries and a shortage of dentists
- Since been safely used in many countries including Japan, China, Australia, Brazil and the United States (Chu CH, Lo EC 2008)
- 2014 Advantage Arrest was cleared by the US Food and Drug Administration for the treatment of dentinal hypersensitivity (tooth sensitivity along gumline)
- 2015 Advantage Arrest became available in the US through Elevate Oral Care, used by Oral Health Professionals off-label to arrest tooth decay

How does SDF work?

First, let's review the decay process and the composition of tooth structure to get a better understanding.....



Quick review of decay process



Remember: Caries is a Bacterial *infection*

Streptococcus Mutans (gram+ cocci)



Lactobacillus (gram+ rods)



THE STAGES OF TOOTH DECAY



Actinomyces (gram+filaments)

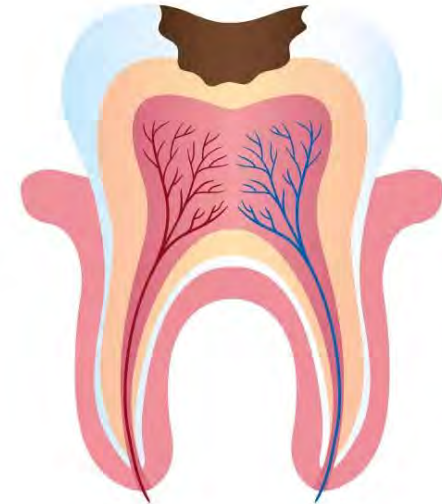


Review-layers of the tooth



What is Tooth Decay?

Tooth decay can be best defined as a bacterial infection that causes demineralization of the protective layers of the teeth, such as the enamel and dentin.



Composition Enamel and Dentin

Enamel :

95% Hydroxyapatite

(Calcium Hydroxy Phosphate - $\text{Ca}_5 (\text{PO}_4)_3 \text{OH}$)

5% other minerals

Dentin:

70% Hydroxyapatite

(Calcium Hydroxy Phosphate - $\text{Ca}_5 (\text{PO}_4)_3 \text{OH}$)

30% Collagen



ORAL BIOFILMS 101



For the most part, biofilms exist symbiotically within the body both externally and internally.

Biofilms are made of bacteria and an **Extracellular Polymeric Substance (EPS)**

This EPS includes proteins, polysaccharides, mucins, etc...

BOTH the host and bacteria contribute to this EPS. This EPS is the *glue* that holds it all together.

Add pathogenic microbes and the mass itself becomes pathogenic. As the bacteria reproduce, the mass gets thicker with a lower pH therefore more pathogenic.

The **MORE THE DENSE MASS** becomes, the more diverse with a mix of bacteria. The layering continues and this diversity makes for a **MORE VIRULENT MASS. MORE ACID.**

acids go right through it to the tooth! **SO DOES THE SDF.**

(slide courtesy of Dr. John Echernach)

SDF Mechanism of Action

- The Silver functions as an antimicrobial (remember the bacteria)
- The Fluoride promotes remineralization of enamel
- The ammonia stabilizes the solution

When it comes into contact with the tooth, the *MAGIC* happens.....



The Silver Diamine Fluoride ($\text{Ag}(\text{NH}_3)_2 \text{F}$), reacts with hydroxyapatite (in the enamel) forming silver phosphate (Ag_3PO_4) and Calcium Fluoride (CaF_2).

$\text{Ag}_3 (\text{PO}_4)$ - silver phosphate- a “salt” kills the bacteria and deposits phosphate and silver into damaged dentin. The “black” look

Ca F_2 - deposits calcium and fluoride into the damaged dentin.

SDF Mechanism of Action

Ag₃ (PO₄) - silver phosphate- “silver salt” embeds into damaged dentin

Ag ion does 3 things:

1. Breaks through the cell wall of the bacteria

2. Breaks down the mitochondria of the cell- This is key, the mitochondria is the “powerhouse” of the cell responsible for producing energy for the cells survival and function

3. Breaks down DNA within the bacterial cell

With the death of the bacteria (cells) killed by the action of the SDF, there is no more enzyme production to break down the collagen in the dentin and no more acid production

SDF destroys the pathogenicity of the Biofilm

SDF for prevention....

Personal Experience

- Placing SDF in clinical practice setting since 2019
- Currently apply SDF in School Based Health office setting
- Apply SDF to Head Start children ages 8mos-4 yr (in classroom settings)



SDF can be applied in any setting. Supplies are portable, set up is minimal

WHY SDF?

This is
Preventable



A Vermont child being treated for Tooth Decay



Getting started is always the hardest part

Together, We can make a big difference

One drop at a time.....



References

Chu CH, Lo EC. Promoting caries arrest in children with silver diamine fluoride: a review. *Oral Health Prev Dent.* 2008;6(4):315-21. PMID: 19178097.

Yamaga R, Yokomizo I. Arrestment of caries of deciduous teeth with diamine silver fluoride. *Dent Outlook.* 1969;33:1007-1013.

Dr John Echternach, DDS



WELCOME to the

**Pediatric Oral Health ECHO:
Emerging Role of Silver Diamine Fluoride for Early
Childhood Caries in Primary Care**

*Session 2, Emerging Opportunities: Use of Silver Diamine Fluoride in Early Childhood
Caries, June 17, 2024*



THE MEDICAL MANAGEMENT OF CARIES

Dr. Colin Boswell , Board Certified Pediatric Dentist



OUR STORY

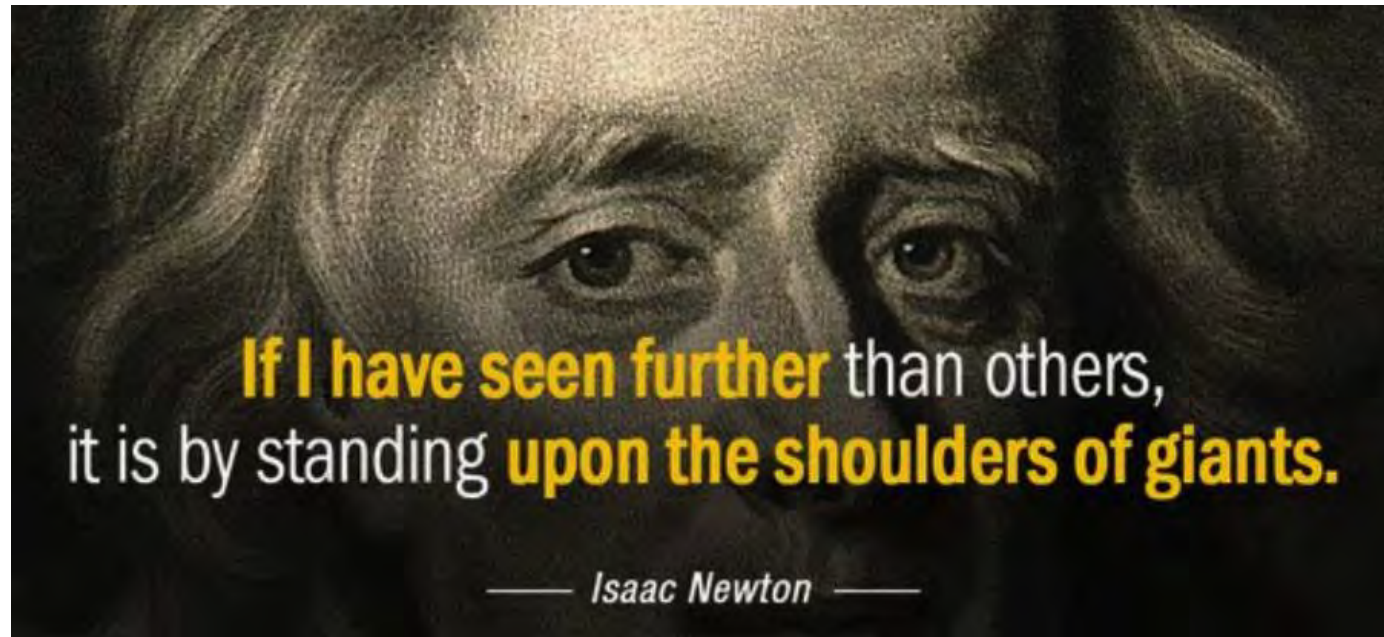


-
- Co-Residents in Alaska
 - Every Child is Welcome
 - Public Health vs. Private Practice?

CLINICAL GOALS: “CLINICAL MISSION STATEMENT”

- 1.) Children who love going to the dentist! Positive attitude towards the medical profession & dental care.
- 2.) Prevent and avoid dental pain (e.g. abscess).
- 3.) Create a healthy oral environment for the adult dentition.
- 4.) Accomplish #1-3 in as minimally invasive way as possible (limit risk).

THANK YOU TO ALL THOSE WHO HAVE PROVIDED A PATH FOR US



MEDICAL MANAGEMENT VS. SURGICAL MANAGEMENT

MEDICAL MANAGEMENT USES
MEDICINE TO COMBAT
BACTERIAL PATHOGENS.

SURGICAL MANAGEMENT
FOCUSES ON REMOVAL OF
BACTERIA AND DISEASED
TISSUE.

There has been a great “schism” between medicine and dentistry. We believe our involvement & practice using medical management and minimally invasive dentistry will help to bridge this gap.

HOW TO APPLY SILVER DIAMINE FLUORIDE

- 1.) Dry the tooth (teeth)



- 2.) Apply SDF for 1 minute (ideally)



- 3.) Apply Varnish







POSTERIOR DENTITION

Screening for Carious Lesions – Posterior



Before SDF

After SDF

WHEN NOT TO USE SDF

- Irreversible Signs/Symptoms - including:
 - Swelling/ Chronic Apical Abscess
 - Pain keeping child awake at night
 - Tylenol does not help
 - Prolonged pain to stimulus (chewing)

ADVERSE EVENTS?

- ~60 years on the market, no adverse events reported in the literature.
- Silver ions stain demineralized tooth, not healthy enamel.
 - "A dark arrested lesion is not an adverse side effect. It is the intended outcome of caries detection and caries arrest using silver ion compounds." - Dr. Steve Duffin
- Staining of skin can occur.
 - As the skin exfoliates, the stain disappears.
- Argyria = Side effect of systemic exposure to large quantities of silver ion.
 - Very unlikely that argyria might result from the small doses used in the MMC.

WHAT CAN SDF BE USED FOR?

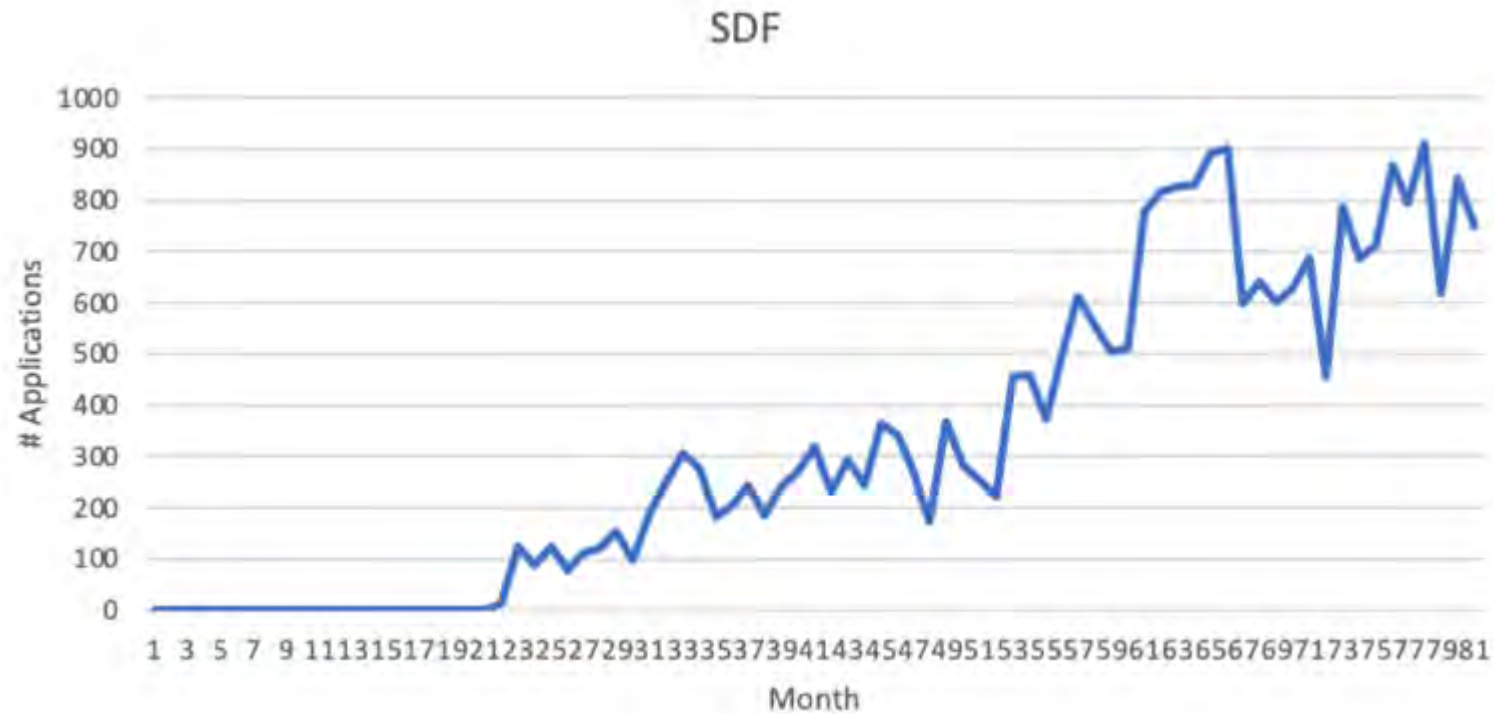
CARIES ARREST

DECREASE SENSITIVITY

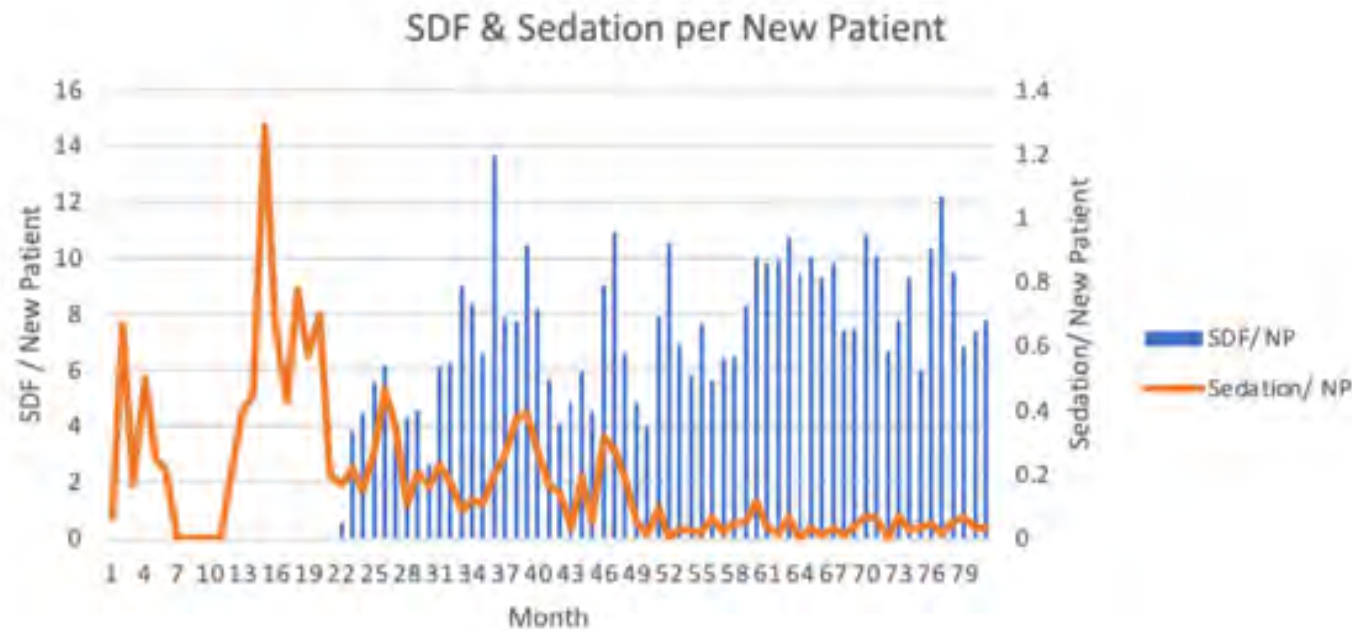
PREVENTS CARIES

CARIES DETECTION

RESULTS FROM OUR PRACTICE : CLAREMONT, NH IMPLEMENTATION OF SDF: 2019

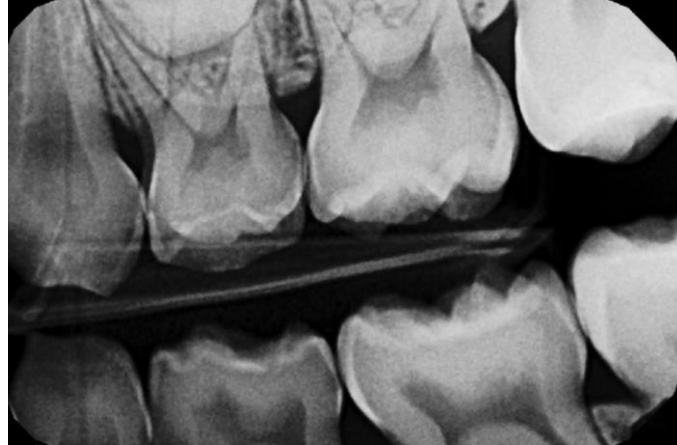
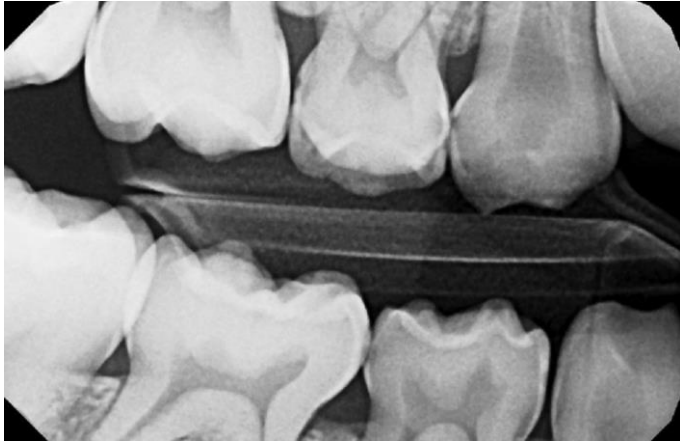


SDF USE COMPARED TO SEDATION CASES

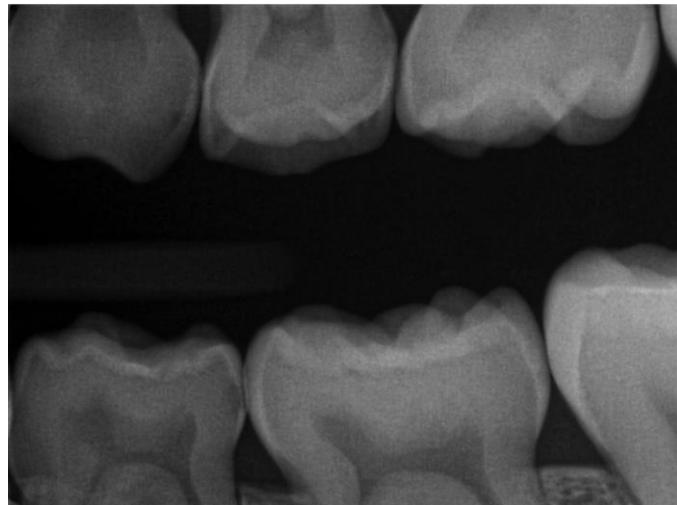
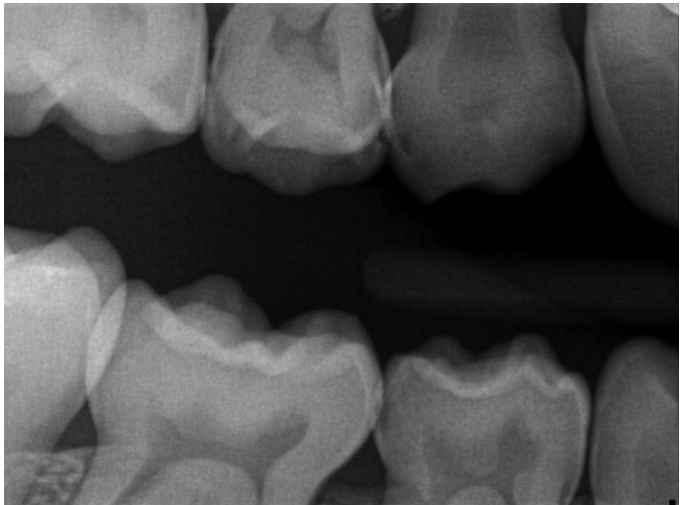


- **74% Reduction in Deep Sedation Cases upon implementation of SDF (2016-2022)**
- **Current Estimated Reduction: 90% (2024) – (in the process of publication)**

CASE STUDY : SELF-REFERRAL



12/3/2019



8/19/2020

3/4/24	19596	Claremont	K,L,S,T	PR post SDF TX K,L,S,T		 <p>03/04/2024 S and T</p>	 <p>03/04/2024 K and L</p>	 <p>03/04/2024 S and T</p>	 <p>03/04/2024 K and L</p>			<p>SDF placed 1/17/23 & 7/21/23 PR placed today with Fuji IX All firm to explorer</p>	Pinders, RDH, CPHDH
--------	-------	-----------	---------	---------------------------	---	--	---	---	---	--	--	---	---------------------

RESEARCH - DATA GATHERING

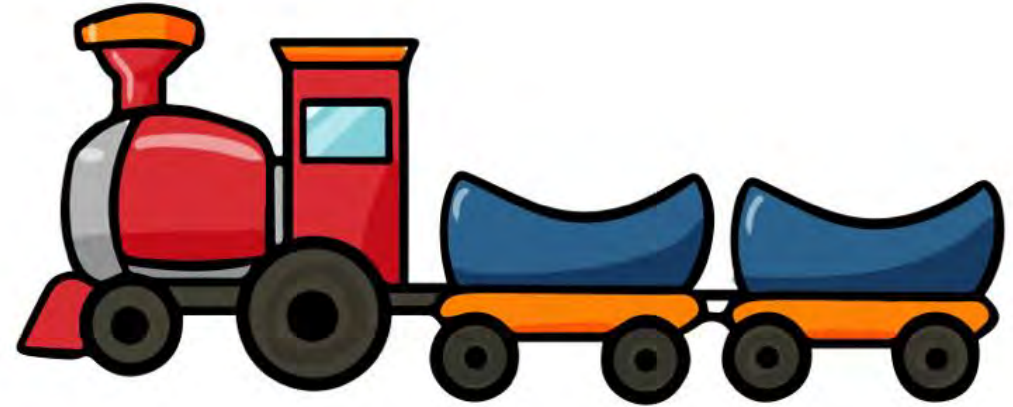


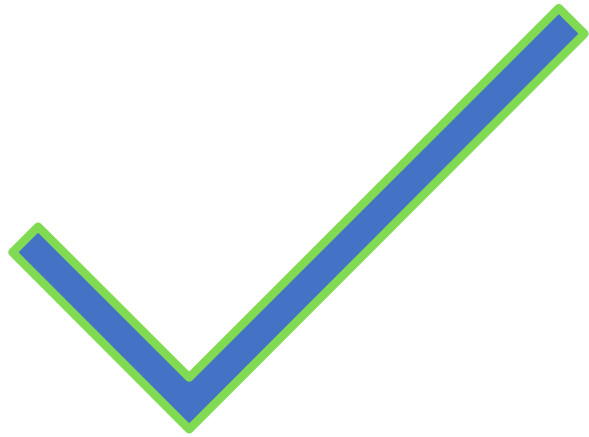
CLINICAL GOALS: “CLINICAL MISSION STATEMENT”

- 1.) Children who love going to the dentist! Positive attitude towards the medical profession & dental care.
- 2.) Prevent and avoid dental pain (e.g. abscess).
- 3.) Create a healthy oral environment for the adult dentition.
- 4.) Accomplish #1-3 in as minimally invasive way as possible (limit risk).

“SLOW DOWN THE TRAIN”

- Minimize/ halt caries progression.
- Reduce sensitivity.
- Improve microbiome of oral environment.
- Reduce number of surgical procedures.
- Reduce sedation.





THANK YOU!





WELCOME to the

Pediatric Oral Health ECHO:
Emerging Role of Silver Diamine Fluoride for Early
Childhood Caries in Primary Care

Session 3, Integrating Silver Diamine Fluoride into your Practice, June 24, 2024

Today's Program

- Brief housekeeping
- Didactic: Integrating Silver Diamine Fluoride into your Practice
 - Lynne Chow, APRN
 - Laura Blaisdell, MD/MPH, FAAP
- Questions and Discussion
- Summary
- Up Next



Promoting Treatment of Pediatric Oral Health Needs with Use of Silver Diamine Fluoride (SDF) in Pediatric Clinics in VT/NH

Lynne Chow, MSN, APRN

Pediatric Oral Health Project Coordinator

Origin of Pilot Project

- DH Community Needs Assessment in 2022 - Care Gap in Oral Health in VT/NH
- Grant funding awarded to Center for Advancing Rural Health Equity (CARHE) through HRSA, Northern Regional Borders, VT DOH, NH DHHS Oral Health Program and other NH partners.
- Pilot program for Silver Diamine Fluoride in Primary Care settings in ages 0-5
- Training provided by Registered Dental Hygienist- PowerPoint and Hands On session.
- Pediatrician- Pediatric Champion- engages clinic Pediatricians, help disseminate learnings from this project to VT and NH American Association of Pediatrics chapters and other channels for disseminating learnings.

Current and Future Trainings

- Mount Ascutney Hospital Pediatrics Clinic: 2 MD's, 2 APRN's
- Ottauquechee Health Center: 1 MD, 1 APRN
- DHMC Purple Pod (Pediatrics) : 2 MD's, 3 Pediatric residents
- Upper Valley Pediatrics, Bradford, VT : 1 MD, 2 APRN's
- White River Family Practice: June and July 2024
- Mom's In Recovery- DH June/July 2024
- Porter Medical Center- Middlebury, VT September 2024

Additional Outreach

Coos County Family Health Services; Little Rivers Health Care; North Star Health; New London Hospital/Newport Health Clinic; Cheshire Medical Center; St. Johnsbury Pediatrics

Barriers to Engagement

- **Payment** - significant foundational barrier for NH practices
- **Scope Concerns/'One More Thing'** - Additional new services are challenging for practices that are stretching to manage existing demands/requirements
- **Field Practice Guidelines Not Yet Established** - Hesitance to move forward without field-sanctioned guidelines (i.e. AAP, AAFP Guidelines).
- **Unfamiliarity with Oral Health as Part of Health Care** - “Silo Effect” Medical and Dental Care have been separate; providers out of comfort zone
- **'Beyond Training' processes** - establishing workflow, institutional approval processes can be time consuming, EMRs, billing codes, etc.

Education and Sustainability Activities

Project ECHO on Pediatric Care and Oral Health/SDF (June 2024)

3-Session virtual case-based learning on SDF application

- Pediatric Oral Health Assessment: Identifying ECC in Your Patients
- Emerging Opportunities: Use of Silver Diamine Fluoride in Early Childhood Caries
- Integrating Silver Diamine Fluoride into your Practice

Pediatric SDF ‘Toolkit’ compiling by August 2024 to include a wide array of resources from this and other Pediatric SDF approaches in other communities (e.g. curated tools, forms, policies, protocol, videos, educational materials, etc.)

Integrating SDF into Primary Care

- **Establish workflow and managing staff resources**
- **Provide instructions for EMR documentation**
- **Provide process for Medicaid/Private Insurers**
vermontmedicaid.com
aap.org- payment for Oral Health Services
- **Identify high risk patients**
- **Provide consent forms and patient education materials**
- **Establish systems for ordering and maintaining supplies**
- **Share collaboration with local dentists re: referral process and support**

Billing

VT Medicaid: CPT code 0792T- reimburse \$23.00 per tooth treated

ICD-10 coding for medical practitioners:

www.aap.org/en/patient-care/oral-health/oral-health-practice-tools/

K02.9: Dental Caries- unspecified

Z91.843: Risk for dental caries, high

K05.1: Chronic gingivitis

Z29.3: Encounter for prophylactic fluoride administration (only varnish)

- SDF could be applied during a Well Child Exam with CPT code 0792T and possibly a 25 modifier or during Episodic/Acute visit
- At a follow up visit for dx of ECC and E&M code and CPT code
- SDF and Fluoride varnish codes can be submitted in addition to billing the office E&M visit based on medical complexity or time

Speak with billing in your organization as well as Medicaid or Private Insurers re: reimbursement

Identify high risk patients

Can you identify patients by reviewing the medical record?

- Ability to go through ICD-10 codes, e.g. diagnosis of ECC, dental dx, oral health risk assessment

Who will identify high risk patients?

- providers, practice nurses/Care Coordinator/EMR Demographics

What are inclusion/exclusion criteria?

- ages, anterior vs. posterior teeth, primary teeth only, those with dental home?

Each year about 400 Vermont children under age 6 are seen in a hospital to treat dental decay. A new treatment option can help to keep children out of the hospital.

SDF is a new way to treat tooth decay.

Silver Diamine Fluoride (SDF) is a liquid that can be brushed on teeth to stop tooth decay. It is applied to teeth without using needles or a drill. SDF has both silver and fluoride in it. Silver kills the germs (bacteria) that cause decay. Fluoride helps repair the tooth. It works best when it is put on more than once. SDF may not work on all cavities. More dental work may still be needed.

SDF turns the decayed area black.

After SDF is put on, the area of decay turns black (see pictures). This means the SDF is working to kill the germs. A dental provider may cover the black treated area with a white filling material if needed.

SDF has been approved by the FDA.

The U.S. Food and Drug Administration (FDA) approved the use of SDF in 2015. In 2017, the FDA granted SDF "breakthrough therapy designation" to stop tooth decay. Some dental providers in Vermont use SDF now. SDF has been used in other countries for many years.

SDF can be very useful for some people.

Children: It is hard for young children to sit still to have cavities filled. That is why some must go to the hospital to be sedated ("put under") to get dental treatment. SDF is put on teeth without needles or drills, so fewer children need to go the hospital to be treated.

Older Vermonters and Vermonters with disabilities: It can be hard for some people to get to a dental office. SDF can be applied in nursing homes, [WIC](#) offices and community settings. SDF is a way to treat dental decay where people live.

Medicaid covers SDF.

Medicaid covers SDF treatment for tooth decay for children and adults.

Not everyone can get SDF.

SDF cannot be used if:

- You are allergic to silver
- You have painful sores or raw areas in your mouth.

More Information

Please contact your dental provider if you have more questions about SDF.

These teeth have been treated with SDF.



What is the difference between fluoride varnish, dental sealants, and SDF?



What is Fluoride Varnish?

- Fluoride varnish is a thick liquid painted on the teeth with a small disposable brush. It makes the tooth stronger and can help prevent cavities.
- Fluoride varnish is flavored, easy to apply and dries quickly.
- Fluoride varnish can be applied anywhere: at a school, health center, medical office, or dental office.



What is a Dental Sealant?

- A dental sealant is a thin protective coating placed on the biting surface of back teeth by a dental professional.
- Back teeth have many small grooves and pits where germs can hide and start cavities. Sealants protect these teeth, especially when children are most at risk for cavities.
- Sealants are less expensive than a filling, easy to apply, and require no needles or drills.
- Sealants may last many years and are checked at regular dental visits.



What is SDF?

- SDF (silver diamine fluoride) is a liquid that can be brushed on teeth to prevent cavities and stop them from growing after they have formed.
- SDF is applied without using needles or a drill.
- SDF has both silver and fluoride in it. Silver kills the germs that cause cavities, and fluoride helps to make the tooth stronger.
- Cavities treated with SDF turn black. This is a sign that SDF is working. After SDF treatment, a dental professional may cover the black treated area with a white filling, if needed.
- SDF has been approved by the FDA for treating sensitive teeth and has received “breakthrough therapy designation” for treating cavities.
- VT Medicaid covers SDF treatment for children and adults.



For more information:

Vermont Department of Health, Office of Oral Health – VTOralhealth@vermont.gov



Secretary of State
Office of Professional Regulation

DENTAL EXAMINERS
SDF Informed Consent Form

Medical Record Number: _____
Patient Name: _____
Date of Birth: _____

Silver Diamine Fluoride (SDF), a liquid approved by the FDA for treatment of sensitive teeth, provides an effective means to temporarily slow active decay until dental treatment can be obtained.

The Procedure:

- Dry teeth.
- Apply SDF to cavities in very small amounts and allow it to dry for 1 minute.
- Do not eat or drink for one hour. After treatment, do not brush your teeth today.

Please let us know if you have one of the following allergies or pre-existing conditions as it may be a reason not to use SDF:

- Allergies to silver or other metals
- Painful mouth sores
- Any abnormal skin sensitivities.

Possible Side Effects:

- SDF will turn a cavity black. See pictures below.
- A metallic taste in the mouth, which will go away quickly.
- If SDF comes in contact with skin and/or gums, temporary staining will occur.
- If SDF is placed on a tooth that has a tooth colored filling, staining may occur.

Please note:

- The side effects listed above may not include all of the side effects reported by the drug's manufacturer. If you notice other effects not listed above, please contact us.
- Treatment of tooth decay with SDF may not prevent the need to place a regular filling in the affected tooth in the future to restore function and esthetics.
- SDF treatment should be repeated within the next six months if you have not yet received dental treatment.

I, _____, have read this form and understand the treatment. The treatment, including the risks and benefits, has been explained to me to my satisfaction and I have had the chance to ask questions. I understand that there is no promise that this treatment will be successful. I hereby give my consent to have a licensed dental hygienist perform this procedure.

Date: _____
Signature of Patient: _____
Signature of Patient's Parent, Guardian, or Legal Representative (if applicable): _____
Signature of witness: _____

These teeth have
been treated
with SDF.



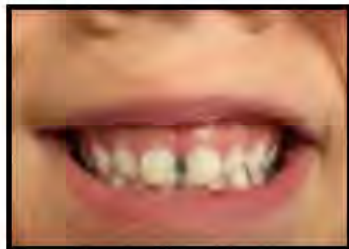
Patient Education



Silver Diamine Fluoride Facts

What is Silver Diamine Fluoride (SDF)?

- SDF is a liquid treatment for tooth decay.
- SDF can help stop cavities from growing.
- Applying SDF is easy and painless. No using needles or a drill.
- SDF has both silver and fluoride in it. Silver kills the germs that cause cavities, and fluoride helps to make the tooth stronger.
- Cavities treated with SDF will turn **black** over the period of a week. The dark color means the SDF treatment is working to kill germs and protect the tooth.
- SDF has been approved by the FDA
- SDF may not work on all cavities and sometimes, more dental work is needed.
- Early treatment can prevent more damage to the tooth.
- For best results, SDF may be applied every 6-12 months.



Who should have SDF treatment?

Very young children who cannot yet cooperate for dental care.

- Children with decayed baby teeth that are not permanent.
- Children with active decay whose treatment will be delayed or be completed over a long period of time.
- Children with dry mouth from medications or chemotherapy or whom other dental treatments are challenging or not possible

Who should not have SDF treatment?

- A silver allergy
- Painful sores in the mouth
- Concerns about staining of the decay

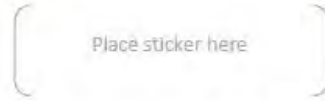
How is SDF treatment done?

- Patient will be positioned "knee to knee" (Provider and parent/guardian's knees almost touching.)
- The tooth/teeth are dried and a small amount of SDF is brushed on areas of active tooth decay.
- Care is taken to avoid allowing SDF to touch the gums, skin, or clothing.
- After 30-60 seconds, fluoride varnish will be applied using a brush.
- The area of decay will turn a dark color 1 week after application. This means the SDF is working.

Please ask your provider if you have any questions about SDF treatment.

Consent Form

Silver Diamine Fluoride (SDF) Consent Form



Silver Diamine Fluoride (SDF), a liquid approved by the FDA for treatment of sensitive teeth, provides an effective means to temporarily slow active decay until dental treatment can be obtained.

The Procedure:

- Dry teeth.
- Apply SDF to cavities in very small amounts and allow it to dry for 1 minute.
- Do not eat or drink for one hour. After treatment, do not brush your teeth today.

Please let us know if you have one of the following allergies or pre-existing conditions as it may be a reason not to use SDF:

- Allergies to silver or other metals
- Painful mouth sores
- Any abnormal skin sensitivities.

Possible Side Effects:

- SDF will turn a cavity black. See pictures below.
- A metallic taste in the mouth, which will go away quickly.
- If SDF comes in contact with skin and/or gums, temporary staining will occur.
- If SDF is placed on a tooth that has a tooth-colored filling, staining may occur.



Please note:

- The side effects listed above may not include all of the side effects reported by the drug's manufacturer. If you notice other effects not listed above, please contact us.
- Treatment of tooth decay with SDF may not prevent the need to place a regular filling in the affected tooth in the future to restore function and esthetics.
- SDF treatment should be repeated within the next six months if you have not yet received dental treatment.

I, _____, have read this form and understand the treatment. The treatment, including the risks and benefits, has been explained to me to my satisfaction and I have had the chance to ask questions. I understand that there is no promise that this treatment will be successful. I hereby give my consent to have a licensed physician, nurse practitioner or physician's assistant perform this procedure.

Signature of Patient or Personal Representative

Date

Printed Name of Patient or Personal Representative

Relationship to Patient

Signature of Witness/Medical Professional: _____

Ordering and Maintaining Supplies

Designate staff to order supplies

List of supplies needed

- Silver Diamine Fluoride 38% (Advantage Arrest- US)
- Dappen Dish
- Cotton Rolls
- Microbrushes
- Mirror
- Chux or bib to protect patient from SDF
- Fluoride Varnish to apply after SDF

NH Dental Practices

These practices accept NEW HAMPSHIRE Medicaid patients
updated 4/24

Schell Family Dental Care Lebanon 603-448-3800	Accepting new patients age 3-20
Montshire Pediatric Dentistry Amherst Office 603-769-3438 Claremont Office 603-543-0455 Henniker Office 603-451-1479 Keene Office 603-354-3895	Also accepts VT Medicaid Accepting new patients through age 13 Accepts patients with cleft lip & palate Offers nitrous oxide in all offices
New London Pediatric Dentistry New London Office 603-877-0069 Concord Office 603-224-3339	Accepting new patients through age 15
Children's Dentistry of the Lakes Region Gilford Office 603-527-2500 Plymouth Office 603-536-2500 Littleton Office 603-444-1500 North Conway Office 603-509-2500	Also accepts VT Medicaid Accepting new patients under age 10 " " Accepting new patients under age 8 " "
Children's Dentistry of Dublin Dublin 603-563-9969	Accepting new patients to college age Dr. Nilfa sees complex kids at Elliot
Lakeside Smiles Pediatric Dentistry Alton 603-280-4500	Accepting new patients Will do IV and light sedation in office
Perfect Dental Manchester 603-932-2377	Accepting new patients

For more options go to www.insurekidsnow.gov

VT Dental Practices

These practices accept VERMONT Medicaid patients
updated 4/24

Children's Dentistry of the Lakes Region Gilford Office 603-527-2500 Plymouth Office 603-536-2500 Littleton Office 603-444-1500 North Conway Office 603-509-2500	Also accepts NH Medicaid Accepting new patients under age 10 " " Accepting new patients under age 8 " "
Chester Dental Center Chester 802-875-2878	Accepting new patients if in service area Call to confirm
Ludlow Dental Center Ludlow 802-228-4446	Not accepting new pediatric patients unless they meet specific criteria – call for details
Middlebury Pediatric Dentistry Middlebury 802-388-0909	Accepting new patients to age 16 if in service area (Addison & Rutland Counties)
Community Dental Rutland Rutland 802-774-5050	Accepting new patients under age 20 – call for details
Ronald McDonald Care Mobile	Child's school nurse will know if service is available Visits schools throughout rural Vermont, bringing dental services to children and adolescents who do not have ready access to dental care.
HealthHUB is a school-based health clinic providing medical, dental hygiene and mental health services to following towns – Bethel, Chelsea, Orange, Randolph, Rochester, S. Royalton, Sharon http://healthhubvt.org/ Stockbridge, Strafford, Tunbridge, Washington, and Williamstown. 802-431-6060	

For more options go to www.insurekidsnow.gov

Upper Valley Dental Practices

These practices see children but DO NOT accept Medicaid
updated 4/24

Just Kids Pediatric Dentistry Norwich, VT 802-649-5210	Accepting new patients under age 10
Mascoma Community Health Dental Center Canaan, NH 603-523-4343	Accepting new patients
Mascoma Dental Associates Lebanon, NH 603-448-4200	Accepting new patients
Patel Dental Group of the Upper Valley Lebanon, NH 603-678-4700	Accepting new patients
Upper Valley Pediatric Dentistry West Lebanon, NH 603-790-8130	Accepting new patients 12 and under

Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs

Yasmi O. Crystal, DMD, MSc, FAAPD¹ • Abdullah A. Marghalani, BDS, MSD, DrPH² • Steven D. Ureles, DMD, MS³ • John Timothy Wright, DMD, MS⁴ • Rosalyn Sulyanto, DMD, MS⁵ • Kimon Divaris, DDS, PhD⁶ • Margherita Fontana, DDS, PhD⁷ • Laurel Graham, MLS⁸

Abstract: Background: This manuscript presents evidence-based guidance on the use of 38 percent silver diamine fluoride (SDF) for dental caries management in children and adolescents, including those with special health care needs. A guideline workgroup formed by the American Academy of Pediatric Dentistry developed guidance and an evidence-based recommendation regarding the application of 38 percent SDF to arrest cavitated caries lesions in primary teeth. **Types of studies reviewed:** The basis of the guideline's recommendation is evidence from an existing systematic review "Clinical trials of silver diamine fluoride in arresting caries among children: A systematic review." (*JDR Clin Transl Res* 2016;1[3]:201-10). A systematic search was conducted in PubMed[®]/MEDLINE, Embase[®], Cochrane Central Register of Controlled Trials, and gray literature databases to identify randomized controlled trials and systematic reviews reporting on the effect of silver diamine fluoride and address peripheral issues such as adverse effects and cost. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach was used to assess the quality of the evidence and the evidence-to-decision framework was employed to formulate a recommendation. **Results:** The panel made a conditional recommendation regarding the use of 38 percent SDF for the arrest of cavitated caries lesions in primary teeth as part of a comprehensive caries management program. After taking into consideration the low cost of the treatment and the disease burden of caries, panel members were confident that the benefits of SDF application in the target populations outweigh its possible undesirable effects. Per GRADE, this is a conditional recommendation based on low-quality evidence. **Conclusions and practical implications:** The guideline intends to inform the clinical practices involving the application of 38 percent SDF to enhance dental caries management outcomes in children and adolescents, including those with special health care needs. These recommended practices are based upon the best available evidence to-date. A 38 percent SDF protocol is included in Appendix II. (*Pediatr Dent* 2017;39(5):E135-E145)

KEYWORDS: SILVER DIAMINE FLUORIDE, CLINICAL RECOMMENDATIONS, GUIDELINE, ANTI-INFECTIVE AGENTS, CARIOSTATIC AGENTS, SILVER COMPOUNDS, CARIES, TOPICAL FLUORIDES

Crystal YO, Marghalani AA, Ureles SD, et al. Use of silver diamine fluoride for dental caries management in children and adolescents, including those with special health care needs. *Pediatr Dent* 2017;39(5):E135-E145

Resources for Medical Providers

- American Academy of Pediatric Dentistry: www.aapd.org
- Dental Guidelines for use of Silver Diamine Fluoride [Overview \(aapd.org\)](#) clinical guidelines
- American Academy of Pediatrics: www.aap.org/tinyteeth, Protect Tiny Teeth Toolkit
- American Academy of Pediatrics SOOH: [/oral-health-practice-tools/](#) Billing and Coding
- American Dental Association: www.ada.org
- Smiles for Life: www.smilesforlifeoralhealth.org Free, virtual instructional videos; modules
- Primary Care Oral Health Integration Guide
- VT DOH: www.healthvermont.gov Oral Health Education Fact Sheets, consent form
- ME: www.fromthefirsttooth.org YouTube video of dental health integration
- Qualis: [Introduction-Case-Change-Oral-Health-Integration.pdf \(safetynetmedicalhome.org\)](#)
Comprehensive toolkit for Oral Health Integration in Primary Care
- [Oral Health: An Essential Component of Primary Care \(safetynetmedicalhome.org\)](#)
- Harvard Medical School Webinar on SDF Application- OGCH; CIPCOE - Integration into practice
www.youtube.com/watch?v=QMvx5glwg_I
- CareQuest Institute for Oral Health, Non-Invasive Caries Therapy Guide - [CareQuest Institute Non-Invasive-Caries-Therapy-Guide_071023.pdf](#)

References

- Crystal YO, Marghalani AA, Ureles SD, et al. Use of silver diamine fluoride for dental caries management in children and adolescents, including those with special health care needs. *Pediatr Dent* 2017;39(5):E135-E145
- Hummel J, Phillips KE, Holt B, Hayes C. *Oral Health: An Essential Component of Primary Care*. Seattle, WA: Qualis Health; June 2015.
- Dartmouth-Hitchcock, Alice Peck Day Memorial Hospital, and Visiting Nurse and Hospice for VT and NH Community Health Needs Assessment FY 2022
- www.aap.org



Integrating into Practice Example

*Laura Blaisdell, MD/MPH, FAAP
Pediatrician, Maine Medical Center
President of Maine Chapter of AAP*