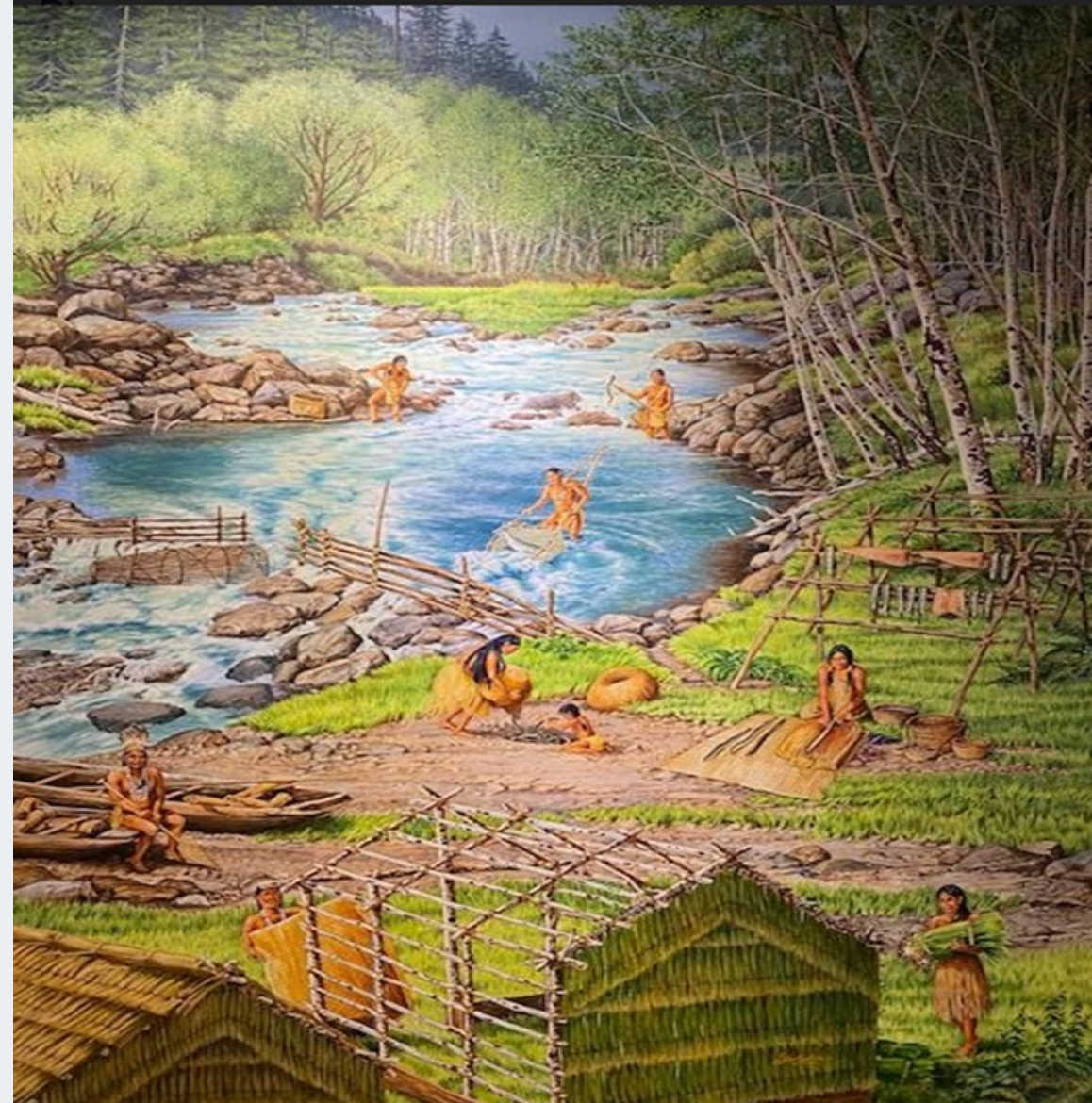


Indian Country Oral Health ECHO: Minimally Invasive Dentistry and Case Presentation

WELCOME!



NORTHWEST PORTLAND AREA
INDIAN HEALTH BOARD
Indian Leadership for Indian Health

Photo of artwork in CTCLUSI tribal

Northwest Portland Area Indian Health Board

Established in 1972, the Northwest Portland Area Indian Health Board (NPAIHB or the Board) is a non-profit tribal advisory organization serving the forty-three federally recognized tribes of Oregon, Washington, and Idaho. Each member tribe appoints a Delegate via tribal resolution and meets quarterly to direct and oversee all activities of NPAIHB.

“Our mission is to eliminate health disparities and improve the quality of life of American Indians and Alaska Natives by supporting Northwest Tribes in their delivery of culturally appropriate, high-quality healthcare.”



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Photo of artwork in Nez Perce
National Historical Park Visitor Center

DISCLAIMER:

We have no financial disclosures or conflicts of interest with the information in this presentation.



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Indian Country Oral Health ECHO:

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TCHPP
DHA Education
Manager



Tacey Mason (Siletz)
MA
NTDSC
Project Director



Objectives:

Upon completion of this course, participants will be able to:

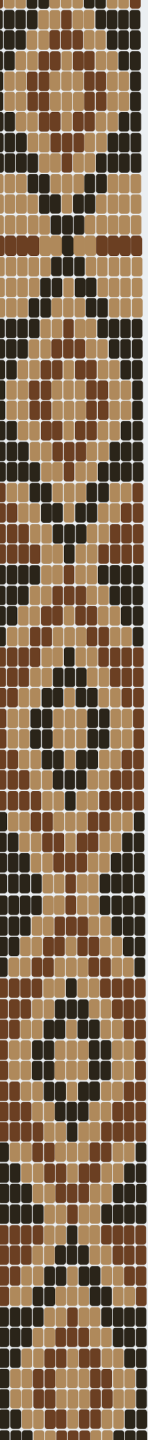
1. Build minimally invasive dentistry skills.
2. Recognize risk factors and apply preventive measures to reduce the occurrence of oral health disease.
3. Learn techniques on how to treat patients with holistic and culturally appropriate care.



Outline:

1. Case Presentation
2. Didactic Presentation
 - Safe and Effective use of Silver Diamine Fluoride (SDF) and Povidone Iodine (PI)
3. Group Discussion and Q&A





“The evidence-base for survival of restorations clearly indicates that restoring teeth is a temporary palliative measure that is doomed to fail if the disease that caused the condition is not addressed properly.”

<https://pubmed.ncbi.nlm.nih.gov/15646587/>



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> Oral Health Prev Dent. 2004;2 Suppl 1:287-92.

What is minimally invasive dentistry?

Dan Ericson ¹

Affiliations + expand

PMID: 15646587

Abstract

Minimally Invasive Dentistry is the application of "a systematic respect for the original tissue." This implies that the dental profession recognizes that an artifact is of less biological value than the original healthy tissue. Minimally invasive dentistry is a concept that can embrace all aspects of the profession. The common delineator is tissue preservation, preferably by preventing disease from occurring and intercepting its progress, but also removing and replacing with as little tissue loss as possible. It does not suggest that we make small fillings to restore incipient lesions or surgically remove impacted third molars without symptoms as routine procedures. The introduction of predictable adhesive technologies has led to a giant leap in interest in minimally invasive dentistry. The concept bridges the traditional gap between prevention and surgical procedures, which is just what dentistry needs today. The evidence-base for survival of restorations clearly indicates that restoring teeth is a temporary palliative measure that is doomed to fail if the disease that caused the condition is not addressed properly. Today, the means, motives and opportunities for minimally invasive dentistry are at hand, but incentives are definitely lacking. Patients and third parties seem to be convinced that the only things that count are replacements. Namely, they are prepared to pay for a filling but not for a procedure that can help avoid having one.

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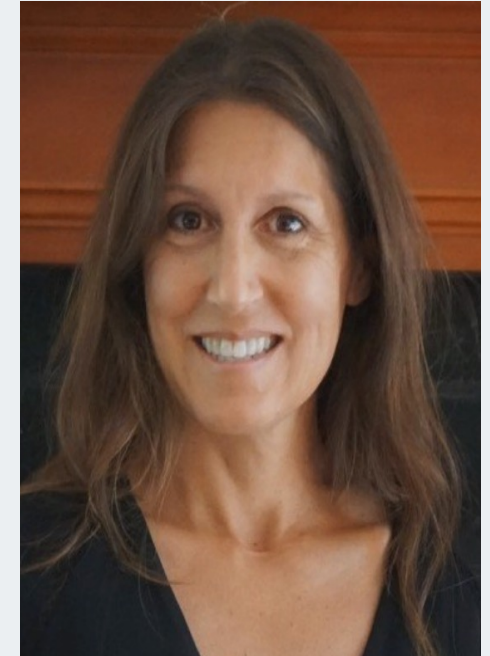
Sean Kelly, DDS, MSHS
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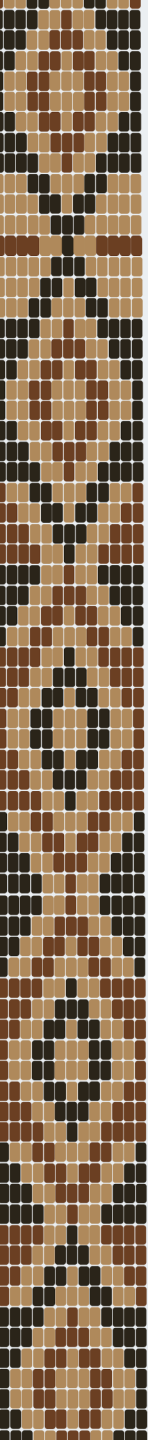


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Case Presentation



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MID in Action

Indian Country Oral Health ECHO

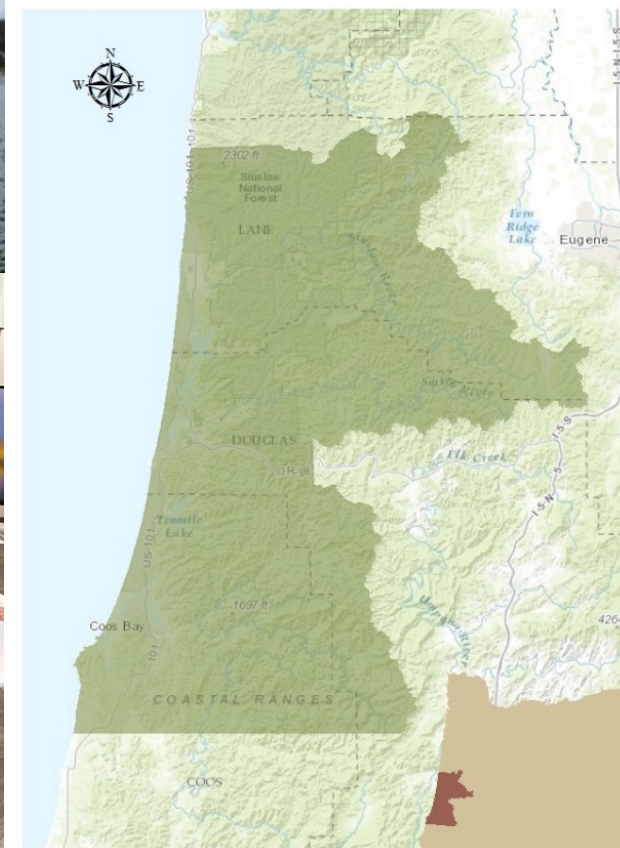
Provided by:
Marissa Gardner, DHAT
CTCLUSI Dental Clinic



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CTCLUSI Aboriginal Ancient Boundary

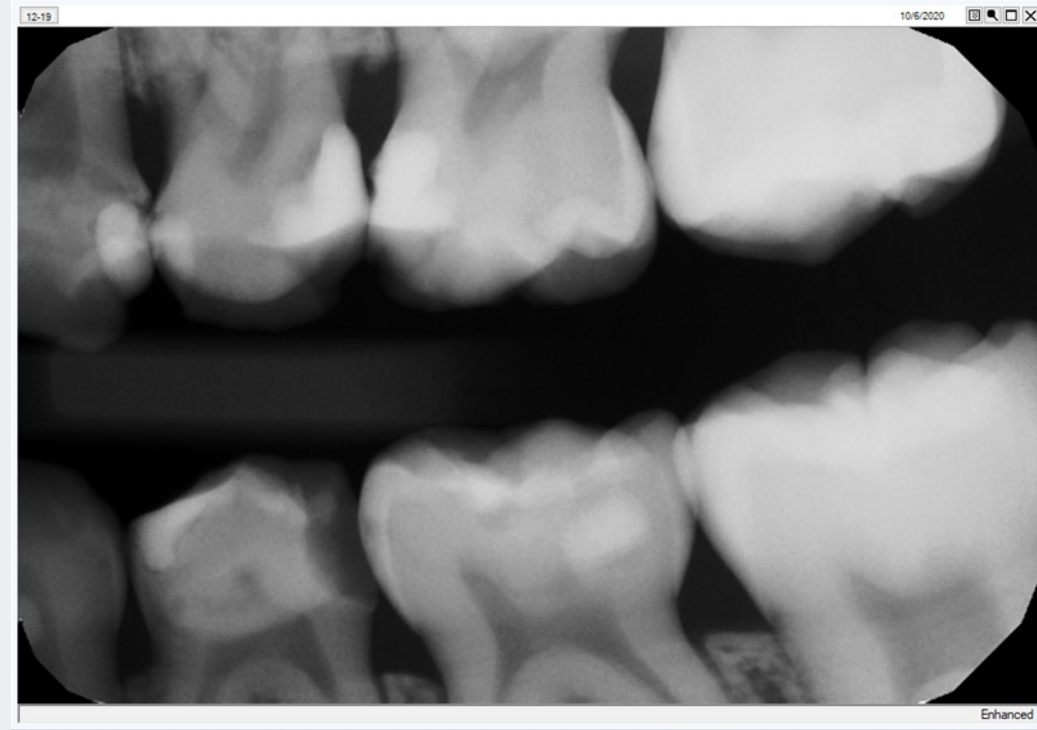


9-year-old female with high caries risk



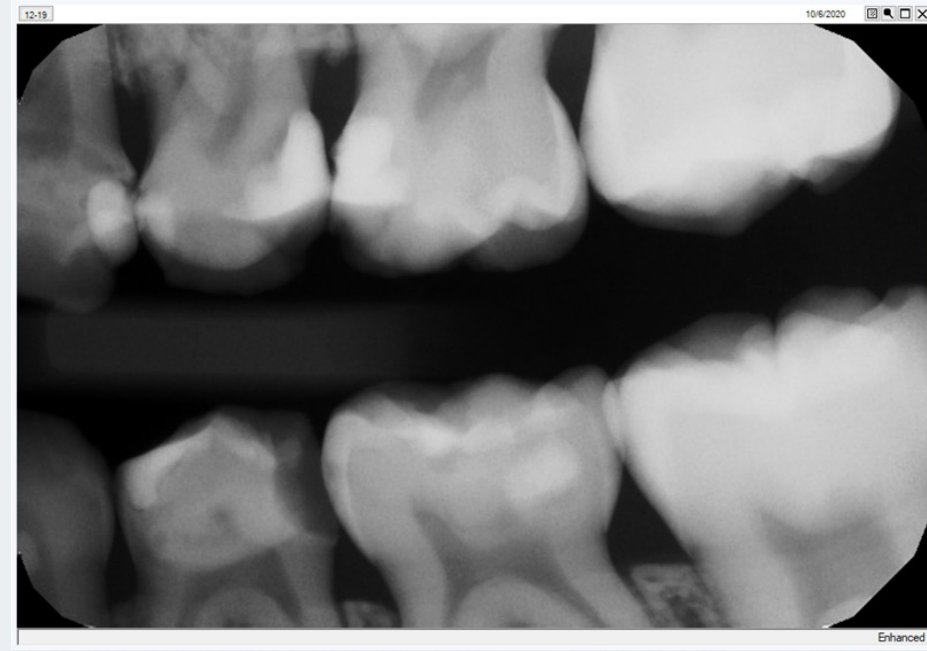
Tooth #L:

- 10/6/2020 exam
- Observation: #L-DO has missing dentin, enamel with soft brown cavitation extending subgingivally.
- Radiolucency appears into dentin on #L-DO.
- Assessment: Dentin-enamel fracture with asymptomatic caries on #L-DO.
- Pt behavior: Pt did well and followed instructions while taking radiographs. Upon completing exam pt would say she was tired and turn over on her belly. Pt refused to have sealants placed. Pt would pretend to cry while I was hand scaling and said that I was "stabbing" her gums. Pt repeatedly comment how she wanted to be done and leave.
- Initial Tx planned: #L-SSC



Tooth #L:

- 12/1/2020 SDF application
- Tooth #A-M, K-OL-DO: Dried surfaces, SDF applied for 1 minute, removed excess with cotton roll, 5% MI fluoride varnish applied.
- Isolation removed.
- Informed pt mother the SDF needs to be applied every week for three consecutive weeks. Informed pt mother that we can place an interim therapeutic restoration on #A, K, L that may need to be replaced with permanent restoration in 6 months to a year. Pt. mother informed due to Covid we are currently only doing non-aerosol generating procedures and that is why we will place an interim therapeutic restoration. Pt mother understood.
- Behavior note: Pt followed all instructions. Pt was very wiggly. Pt responded well to taking short breaks during procedure.
- No photo taken before SDF application was applied.



Tooth #L:

- **12/17/2021 ART completed**
- **Observation:** Hard Tissue Findings: Missing dentin, enamel with hard black cavitation on #L-DO. #L is palpation and percussion negative.
- Radiographic Findings: Radiolucency appears to be approaching pulp on #L-D.
- **Assessment:** Dentin-enamel fracture with asymptomatic caries on #L-DO previously treated with sdf.
- **Procedure:** Rubber dam and Isolite attempted. Isolation achieved with dri-angle and cotton roll with use of small bite block.
- No anesthetic needed. Tooth #L-DO cleaned margins, tactilely hard black discolored dentin remains. Matrix band and wedge placed. GC cavity conditioner placed and rinsed, Equia forte shade A2 placed and hardened. Excess removed, wedge and matrix removed. Checked contact and occlusion, adjustments made.
- Informed pt and pt mother the decay on tooth #L is really deep and if it starts to become symptomatic the tooth may need further tx. Pt and pt mother expressed understanding and agreed.



Tooth #L:

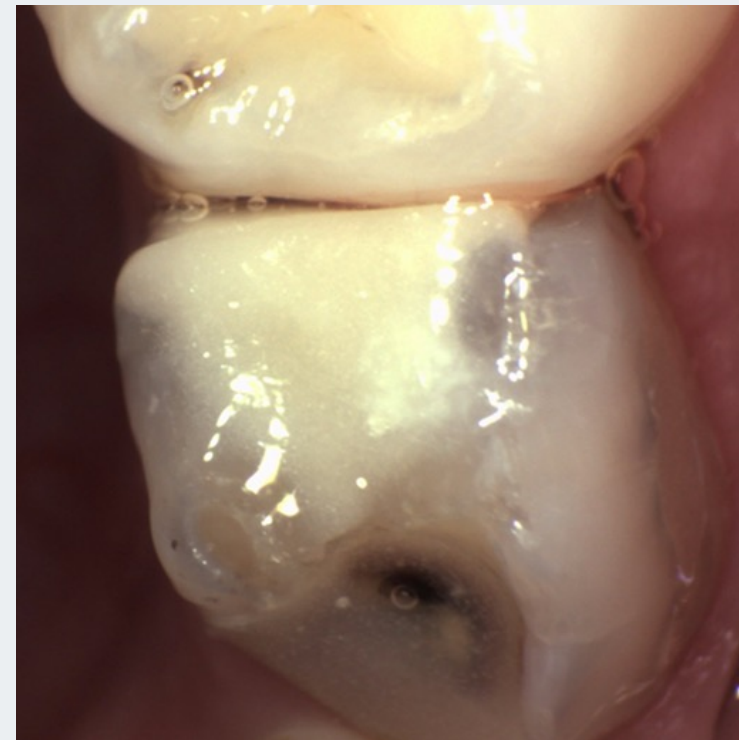
Pre-Op



Mid-Op

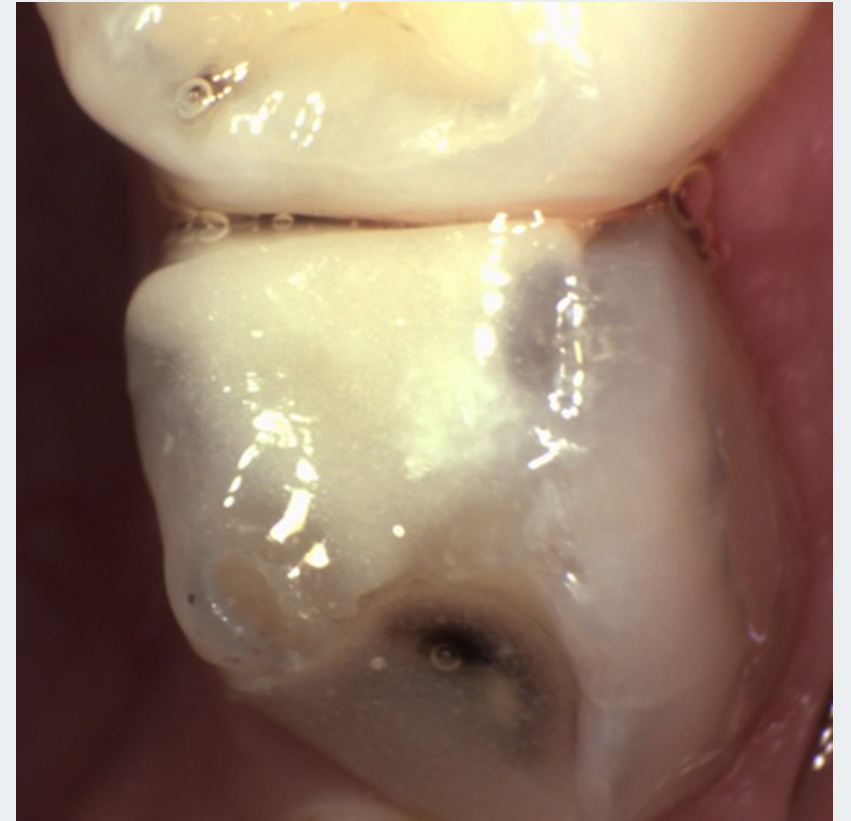


Post Op



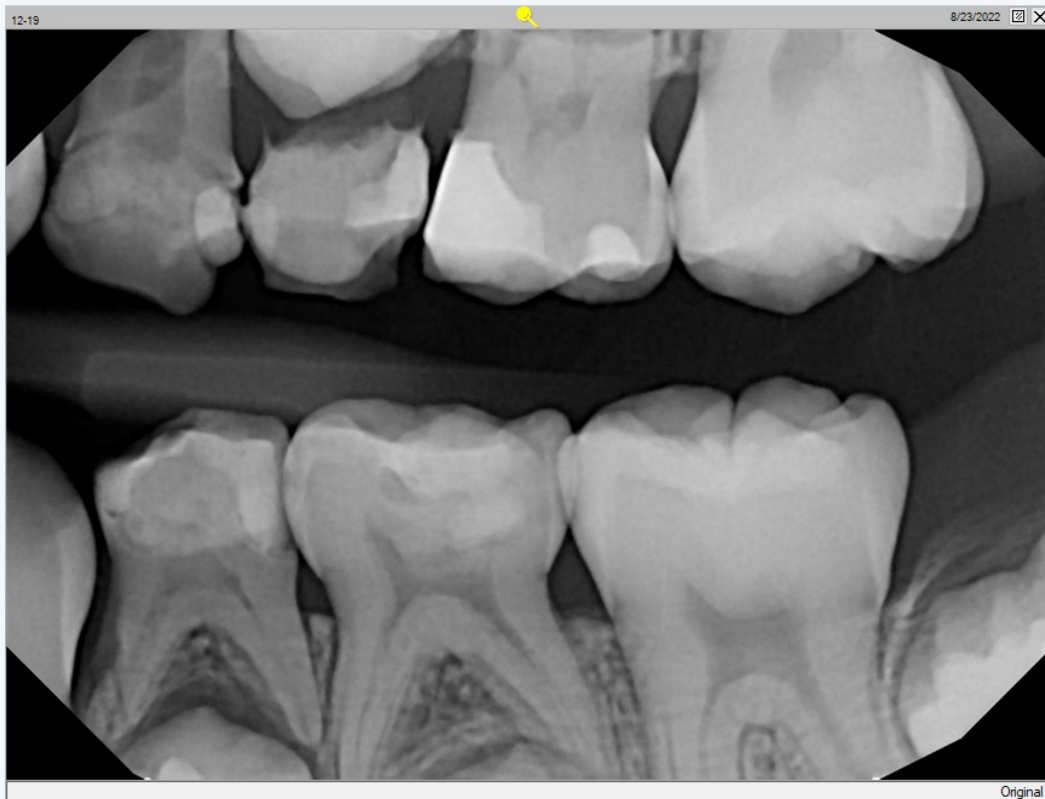
Tooth #L:

- **Reevaluation: October 2022**
- Tooth #L is non symptomatic, all margins in tact,
- WNL. Nearing natural exfoliation.

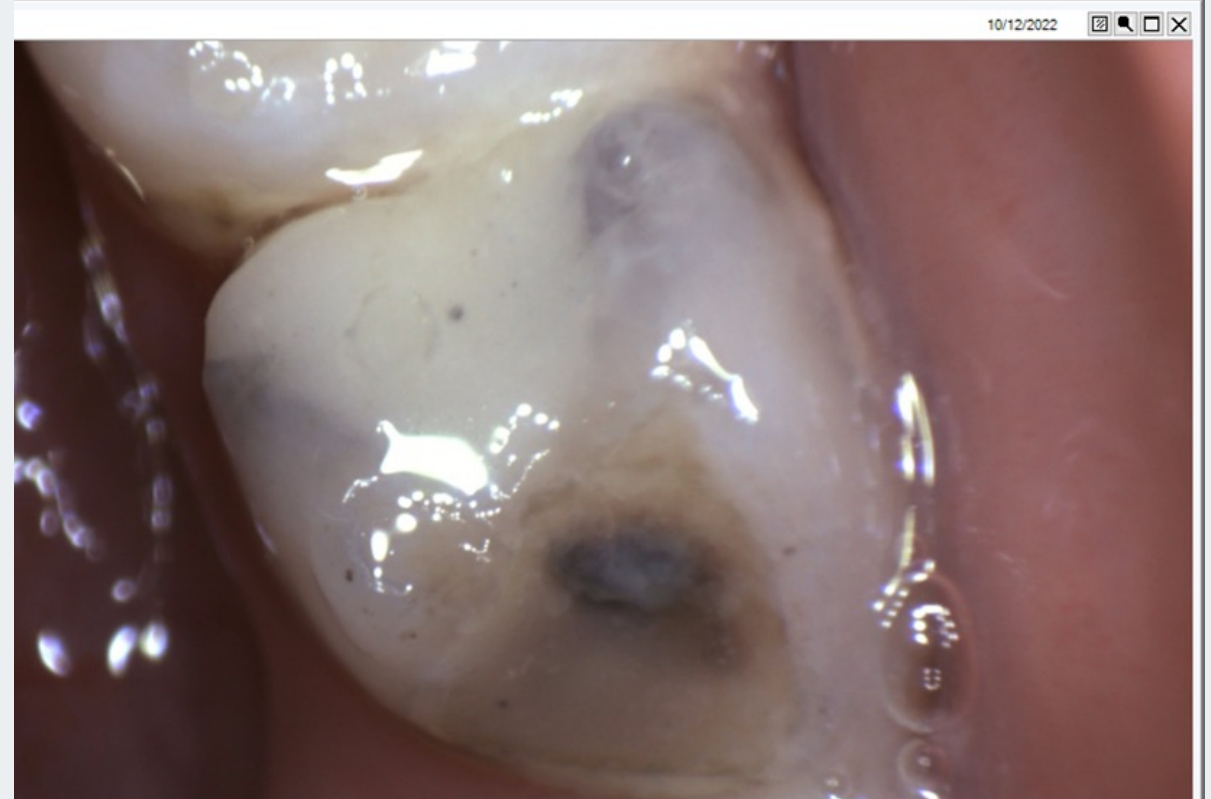


Tooth #L:

8/23/2022



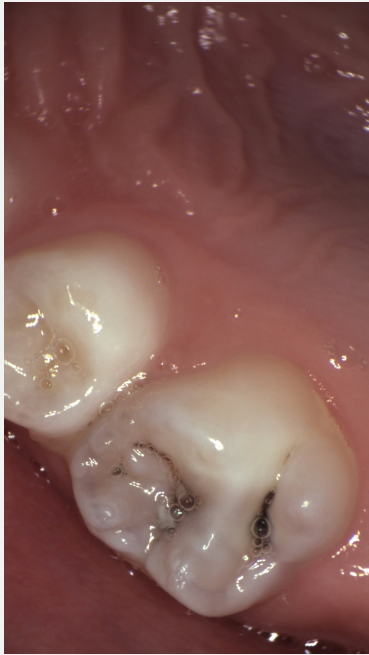
10/12/2022



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MID IN ACTION CASE #2

4 YEAR OLD WITH HIGH CARIES RISK



PT'S STORY

- Currently Living with a foster guardian.
- Parents experienced drug abuse and family were living in their car.
- "bad situation and the boys can tell you stories of what they have seen, things that they should not have seen".
- Father became full custodian of children and moved out of town.

TREATMENT

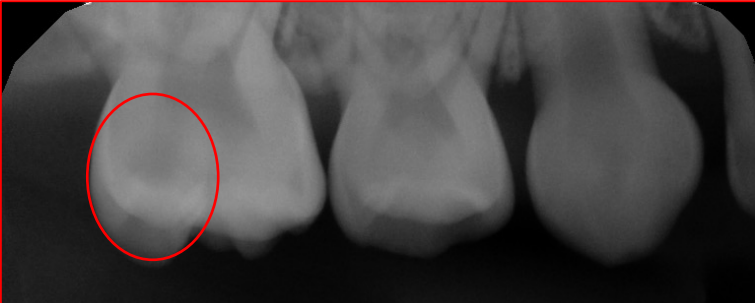
- #A-O, I-DO, J-O, K-O, L-O, T-O: asymptomatic caries.
- 1 application of SDF/ Once week X 3
- ART (atraumatic restorative treatment)

BEHAVIOR NOTE

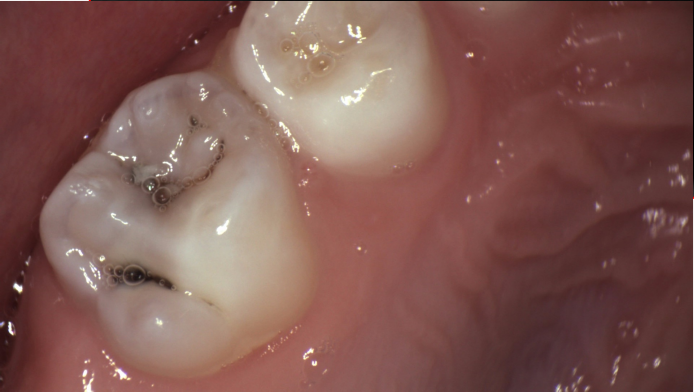
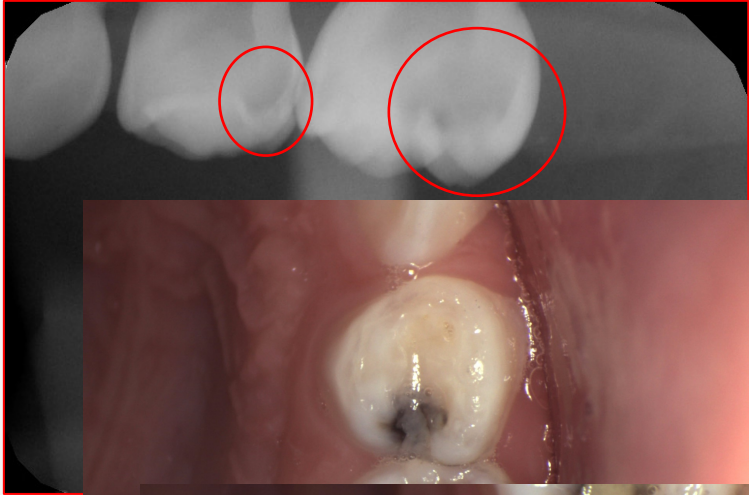
- Scared. His brother assisted with appointments
- Sat up in chair
- Watched in a hand held mirror
- Cried during SDF appl.

PRE OP. TEETH #A, I, J, K

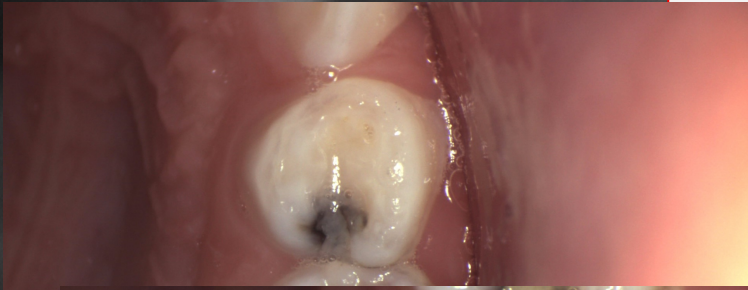
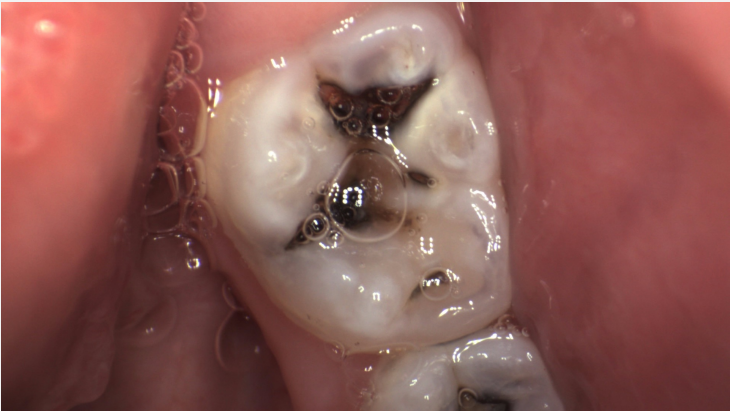
Tooth #A



Tooth #I, J



Tooth #K



ART COMPLETION #K

- LA not indicated.
- #K-O: partial caries removal with excavation spoon, margins cleaned, dark black dentin and chalky enamel remains, GC cavity conditioner applied and rinsed, Equia Forte shade A2 placed and hardened.

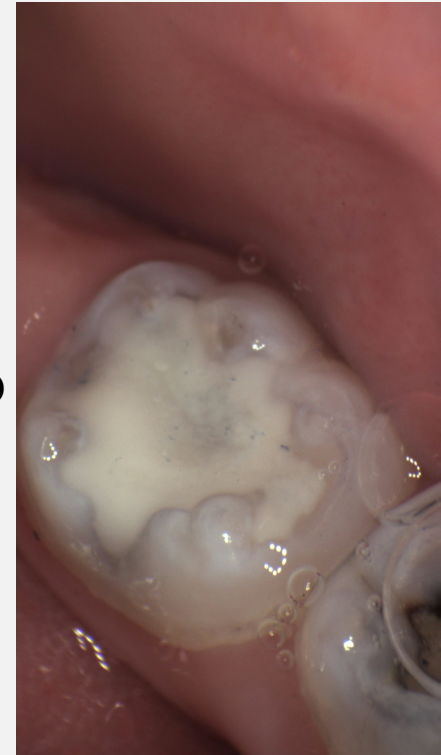


P
R
E

MID



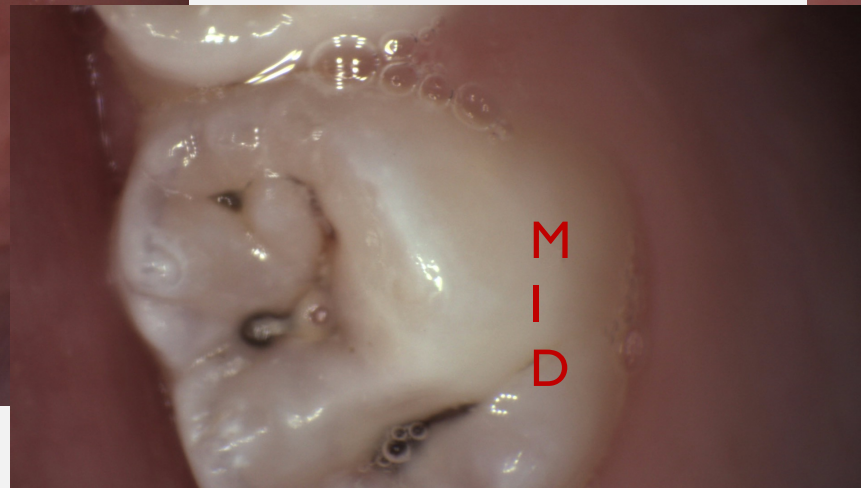
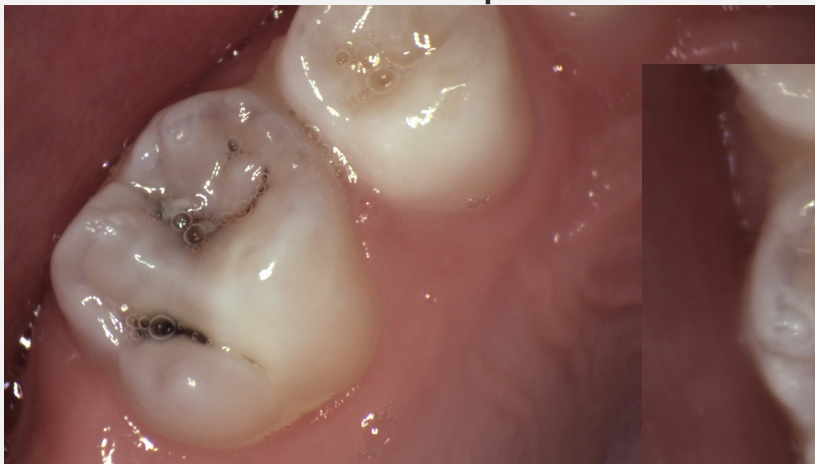
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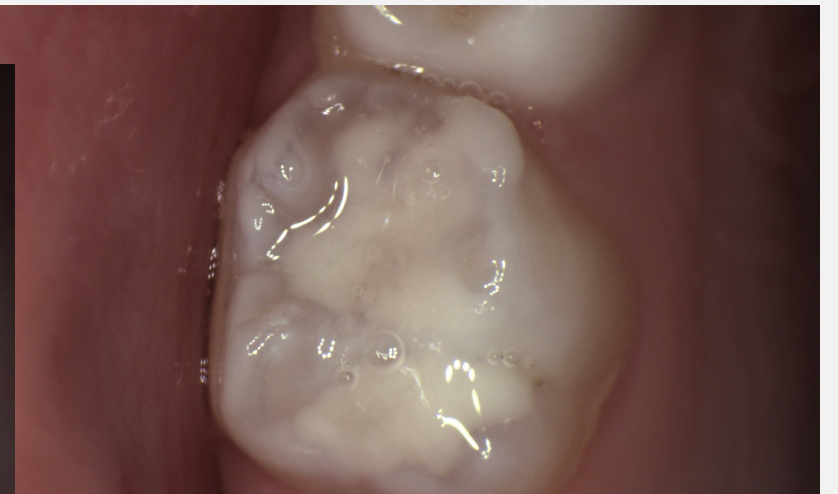
ART COMPLETION # A

- LA not indicated. Isolation not achieved.
- #A-O: partial caries removal with slow speed round bur, margins cleaned, dark black dentin and chalky enamel remains, leathery dentin remains on pulpal floor. Tooth #A-O: GC cavity conditioner applied and rinsed, Equia Forte shade A2 placed and hardened. Occlusal checked, no adjustments needed.

PRE



POST

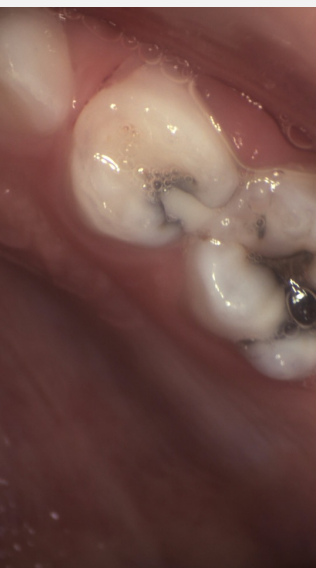


ART COMPLETION # I & J

PRE



#I-DO. Mid op photo not taken due to pt behavior.



P
O
S
T

M
I
D



PRE



POST

LAST APPOINTMENT

- Exam & Hygiene
- Hard Tissue Findings: All dentition felt tactilely hard to the explorer and testing WNL.
- High caries risk with no decay present.

Thank You!



Provided by:
Marissa Gardner, DHAT
CTCLUSI Dental Clinic



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Didactic Presentation



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Silver Diamine Fluoride (SDF) and Povidone Iodine (PI)



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Silver Diamine Fluoride (SDF):



Caries Risk Protocol & Management:

CAMBRA for 0-6 year olds

<https://www.frontiersin.org/articles/10.3389/froh.2021.657518/full>



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TABLE 3 | Care pathways for caries management based upon risk assessment for ages 0–6 years.

Risk category	Diagnostic		Preventive interventions			Restoration	
	Periodic oral exams	Radiographs	Fluoride	Diet counseling	Self-management goals	Sealants	Existing lesions
CARE PATHWAYS FOR CARIES MANAGEMENT BASED ON RISK FOR CHILDREN 0-6 YEARS OF AGE							
Low	6–12 mos	12–24 mos	Brush twice daily with F toothpaste [¥]	No	No	No	
Moderate	6 mos	6–12 mos	Brush twice daily with F toothpaste [¥] optimize F intake [£] FV every 6 mos	Yes	Yes	On enamel defects and pits & fissures at-risk	Active surveillance for developing lesions
High	3 mos	6 mos	Brush twice daily with F toothpaste [¥] optimize F intake [£] FV every 3 mos	Yes	Yes	On enamel defects and pits & fissures at-risk	Remineralize enamel-only lesions with FV; restoration of cavitated lesions, or non-surgical caries management with ITR or SDF as appropriate.
Very high: with extensive existing disease	Monthly	6 mos	Brush three times daily with F toothpaste [¥] optimize F intake [£] FV every 1–3 mos Consider additional therapies for caries control*	Yes	Yes	All pits and fissures	Consider caries control prior to surgical tx. Remineralize enamel-only lesions with FV; restoration of cavitated lesions, or non-surgical caries management with ITR or SDF as appropriate

[¥] Smear of 1,000 ppm fluoride toothpaste for 0–2 year-olds, pea-size of fluoride toothpaste for 3–6 year-olds (or equivalent for specific area).

[£] Recommend drinking fluoridated water (from tap or bottled), parental brushing, spit and don't rinse toothpaste.

*Wipe with baking soda/xylitol, use casein phosphopeptide–amorphous calcium phosphate (ACP/CPP) paste.

FV, fluoride varnish; ITR, interim therapeutic restoration; SDF, silver diamine fluoride; mos, months.

Caries Risk Protocol & Management:

AAPD for 0-5 year olds

https://www.aapd.org/globalassets/media/policies_guidelines/bp_cariesriskassessment.pdf?v=new



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Table 3. Example of Caries Management Pathways for 0-5 Years Old

Risk category	Diagnostics	Preventive interventions			Restorative interventions
		Fluoride	Dietary counseling	Sealants	
Low risk	<ul style="list-style-type: none"> – Recall every six to 12 months – Radiographs every 12 to 24 months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water – Twice daily brushing with fluoridated toothpaste 	Yes	Yes	– Surveillance
Moderate risk	<ul style="list-style-type: none"> – Recall every six months – Radiographs every six to 12 months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water (alternatively, take fluoride supplements with fluoride-deficient water supplies) – Twice daily brushing with fluoridated toothpaste – Professional topical treatment every three months 	Yes	Yes	<ul style="list-style-type: none"> – Active surveillance of non-cavitated (white spot) caries lesions – Restore cavitated or enlarging caries lesions
High risk	<ul style="list-style-type: none"> – Recall every three months – Radiographs every six months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water (alternatively, take fluoride supplements with fluoride-deficient water supplies) – Twice daily brushing with fluoridated toothpaste – Professional topical treatment every three months – Silver diamine fluoride on cavitated lesions 	Yes	Yes	<ul style="list-style-type: none"> – Active surveillance of non-cavitated (white spot) caries lesions – Restore cavitated or enlarging caries lesions – Interim therapeutic restorations (ITR) may be used until permanent restorations can be placed

Caries Risk Protocol & Management:

**AAPD for
≥ 6 year
olds**

https://www.aapd.org/globalassets/media/policies_guidelines/bp_cariesriskassessment.pdf?v=new



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Table 4. Example of a Caries Management Pathways for ≥ 6 Years Old

Risk category	Diagnostics	Preventive interventions			Restorative interventions
		Fluoride	Dietary counseling	Sealants	
Low risk	<ul style="list-style-type: none"> – Recall every six to 12 months – Radiographs every 12 to 24 months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water – Twice daily brushing with fluoridated toothpaste 	Yes	Yes	– Surveillance
Moderate risk	<ul style="list-style-type: none"> – Recall every six months – Radiographs every six to 12 months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water (alternatively, take fluoride supplements with fluoride-deficient water supplies) – Twice daily brushing with fluoridated toothpaste – Professional topical treatment every six months 	Yes	Yes	<ul style="list-style-type: none"> – Active surveillance of non-cavitated (white spot) caries lesions – Restore cavitated or enlarging caries lesions
High risk	<ul style="list-style-type: none"> – Recall every three months – Radiographs every six months 	<ul style="list-style-type: none"> – Drink optimally-fluoridated water (alternatively, take fluoride supplements with fluoride-deficient water supplies) – Brushing with 0.5 percent fluoride gel/paste – Professional topical treatment every three months – Silver diamine fluoride on cavitated lesions 	Yes	Yes	<ul style="list-style-type: none"> – Active surveillance of non-cavitated (white spot) caries lesions – Restore cavitated or enlarging caries lesions – Interim therapeutic restorations (ITR) may be used until permanent restorations can be placed

Caries Risk Protocol & Management:

Indian Health Service Division of Oral Health
Caries Risk Classification and Recall Intervals – Oct. 1, 2017

Overview: The IHS Division of Oral Health recommends that all dentate patients be assessed for caries risk at examination appointments or annually and that a preventive recall schedule be customized to each patient based upon their caries risk. The below guide can be printed and placed in each dental operatory to provide recommendations to the dental health care professional regarding an appropriate risk classification, preventive recall interval, and prevention strategies that can be employed.

0-5 Years of Age (only two risk classifications) Corresponding ADA Caries Risk Code	Low D0601	High D0603
Risk Determination:		
• Cavitated or non-cavitated lesion (any number), active	None	Any
• Any caries experience	None	Yes
• Positive family caries history (high caries in family)	No	Yes
• Poor oral hygiene/moderate to heavy plaque	No	Yes
Preventive/Early Intervention Strategies:		
• Community water fluoridation exposure	X	X
• Fluoride varnish application	1-2x/yr	3-4x/yr
• Emphasis on fluoridated toothpaste (supervised)	X	X
• Dental sealants, resin and/or glass ionomer, at time of exam if possible	X	X
• Motivational interviewing (parent)	X	X
• Nutritional counseling, as indicated		X
• Interim therapeutic restorations		X
• Crowns, including Hall technique		X
• Silver ion antimicrobials		X
• Traditional restorations (amalgam/composite/glass ionomer)		X
Recall Interval Suggested:	6-12 mos.	3-4 mos.

6 Years and Over (three risk categories; "very high" has been removed) Corresponding ADA Caries Risk Code	Low D0601	Moderate D0602	High D0603
Risk Determination:			
• Cavitated or non-cavitated lesion (any number), active	None	1-2	3+
• Smooth surface lesion	None	No	Possible
• Any caries experience	Possible	Yes	Yes
• Poor oral hygiene/moderate to heavy plaque	No	Possible	Yes
Preventive/Early Intervention Strategies:			
• Community water fluoridation exposure	X	X	X
• Fluoride supplements, as indicated	X	X	X
• Fluoride varnish application	1-2x/yr	1-2x/yr	2-4x/yr
• Emphasis on fluoridated toothpaste (supervised)	X	X	X
• Dental sealants, resin, at time of exam	X	X	X
• Xylitol or sugar-free gum			X
• Assess <i>Mutans Streptococci</i> , <i>Lactobacillus</i> levels			X
• Nutritional counseling, as indicated			X
• Interim therapeutic restorations			X
• Silver ion antimicrobials			Possible
• Traditional restorations (amalgam/composite)		X	X
• Motivational interviewing		X	X
Recall Interval Suggested:	12 mos.+	6-12 mos.	3-6 mos.

0-5 years of age

Preventive/Early Intervention Strategies:

• Community water fluoridation exposure	X	X
• Fluoride varnish application	1-2x/yr	3-4x/yr
• Emphasis on fluoridated toothpaste (supervised)	X	X
• Dental sealants, resin and/or glass ionomer, at time of exam if possible	X	X
• Motivational interviewing (parent)	X	X
• Nutritional counseling, as indicated		X
• Interim therapeutic restorations		X
• Crowns, including Hall technique		X
• Silver ion antimicrobials		X
• Traditional restorations (amalgam/composite/glass ionomer)		X
Recall Interval Suggested:	6-12 mos.	3-4 mos.

6 years and over

Preventive/Early Intervention Strategies:

• Community water fluoridation exposure	X	X	X
• Fluoride supplements, as indicated	X	X	X
• Fluoride varnish application	1-2x/yr	1-2x/yr	2-4x/yr
• Emphasis on fluoridated toothpaste (supervised)	X	X	X
• Dental sealants, resin, at time of exam	X	X	X
• Xylitol or sugar-free gum			X
• Assess <i>Mutans Streptococci</i> , <i>Lactobacillus</i> levels			X
• Nutritional counseling, as indicated			X
• Interim therapeutic restorations			X
• Silver ion antimicrobials			Possible
• Traditional restorations (amalgam/composite)		X	X
• Motivational interviewing		X	X
Recall Interval Suggested:	12 mos.+	6-12 mos.	3-6 mos.

https://www.ihs.gov/doh/clinicmanagement/ohpgpdf/Chapter%204/12IHS-OPHS790-DEN_HNB_Chapter4_SectionE.pdf



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Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride

How to Apply Silver Diamine Fluoride

ADA American Dental Association®
America's leading advocate for oral health

ADA.

Silver Diamine Fluoride



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride



Key Points

- There is growing appreciation of silver diamine fluoride (SDF) to arrest caries lesions, which is an off-label use; SDF currently has FDA clearance as a desensitizing agent.
- The potential benefits for use of SDF treatment for caries arrest include its low cost and ease of application.
- The potential harms for use of SDF treatment for caries arrest include permanent black stain on the arrested caries lesions.
- Semi-annual application of SDF is recommended for sustained benefit.

Introduction

SDF Composition and Mechanisms of Action

SDF for Treatment of Dentin Sensitivity

Use of SDF for Caries Arrest

Summary

References



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):



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PRACTICE GUIDELINES COVER STORY | VOLUME 149, ISSUE 10, P837-849.E19, OCTOBER 2018

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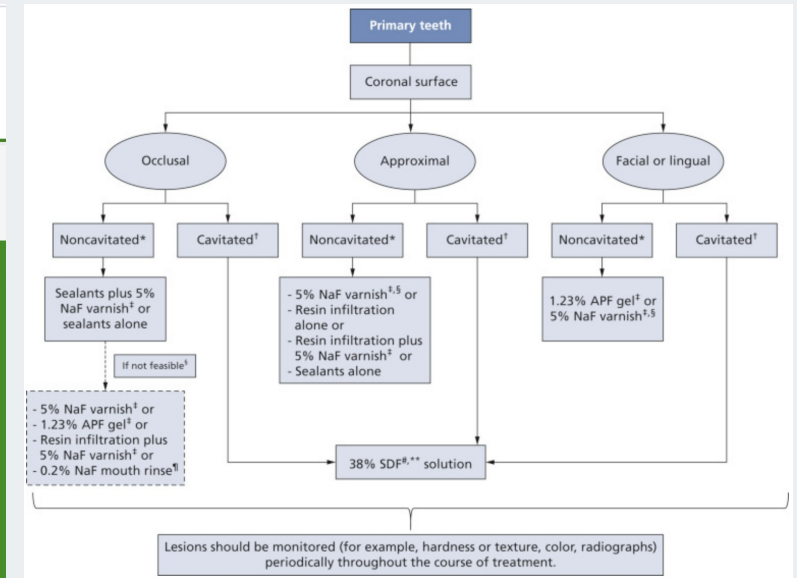
Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions

A report from the American Dental Association

Rebecca L. Slayton, DDS, PhD • Olivia Urquhart, MPH • Marcelo W.B. Araujo, DDS, MS, PhD • ...

Lauren Pilcher, MSPH • Laura Banfield, MLIS, MHSc • Alonso Carrasco-Labra, DDS, MSc • Show all authors

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[https://jada.ada.org/article/S0002-8177\(18\)30469-0/fulltext?_gl=1*7x2ewe*_ga*OTkzODg1MTY3LjE2NzQ1OTYxNzU.*_ga_NJ0EYRGSL1*MTY4MzQ5OTU2OC43LjEuMTY4MzUwMDg0My41MS4wLjA.*_ga_X8X57NRJ4D*MTY4MzQ5ODYwOC42LjEuMTY4MzUwMDg0My4wLjAuMA..&_ga=2.169544865.1269623635.1683498314-993885167.1674596175](https://jada.ada.org/article/S0002-8177(18)30469-0/fulltext?_gl=1*7x2ewe*_ga*OTkzODg1MTY3LjE2NzQ1OTYxNzU.*_ga_NJ0EYRGSL1*MTY4MzQ5OTU2OC43LjEuMTY4MzUwMDg0My41MS4wLjA.*_ga_X8X57NRJ4D*MTY4MzQ5ODYwOC42LjEuMTY4MzUwMDg0My4wLjAuMA..&_ga=2.169544865.1269623635.1683498314-993885167.1674596175)

Silver Diamine Fluoride (SDF):



Welcome: Sean Kelly
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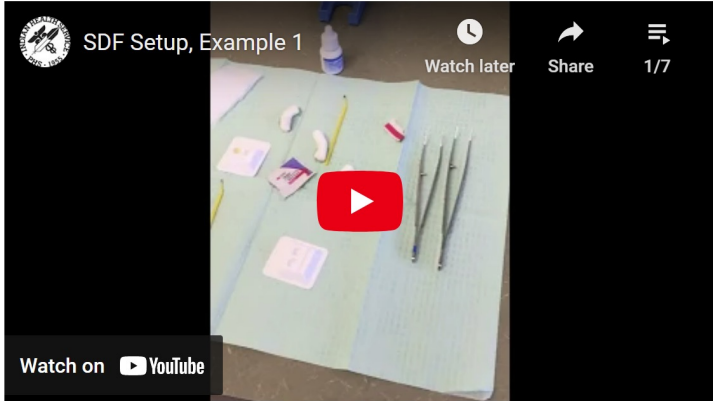
Dental Portal

- Home Page
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- Dental Specialities Manual
- Dental Trauma
- Efficiency & Effectiveness
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- Oral Health Program Guide
- Pain Management
- PANDA
- Pathways
- Radiology
- Resources
- Specialty Consultants

Caries Diagnosis, Risk Assessment and Management

Caries Intervention using Silver Ion Antimicrobials (SIA) – Demonstration Video Series

SIA therapy (either 38% silver diamine fluoride [SDF] or 25% silver nitrate) is a useful caries intervention when used conscientiously and in the right circumstances (i.e. young children, root caries, etc.). The following videos demonstrate the proper set up for SIA therapy, the application of SIAs on patients, and one possible complication – the staining of the lip. More details on the use of SIAs and getting an informed consent are available on the “Clinic” tab in the [Oral Health Program Guide, chapter 4, section V](#). [be patient – they may take a few moments to open]



Watch on YouTube

Individual Demonstration Video Links

1. [SDF Setup - Example 1](#) [video]
2. [SDF Setup - Example 2](#) [video]
3. [Application of SDF in a Child - Example 1](#) [video]
4. [Application of SDF in a Child - Example 2](#) [video]
5. [Application of SDF in a Child - Example 3](#) [video]
6. [SDF Staining of Lip](#) [video]
7. [Application of SDF in an Adult](#) [video]



Silver Diamine Fluoride (SDF):

Silver diamine fluoride (SDF) is a colorless liquid that at pH 10 is 24.4% to 28.8% (weight/volume) silver and 5.0% to 5.9% fluoride.

Mei ML, Chu CH, Lo EC, Samaranayake LP. Fluoride and silver concentrations of silver diamine fluoride solutions for dental use. *Int J Paediatr Dent* 2013;23(4):279-85.



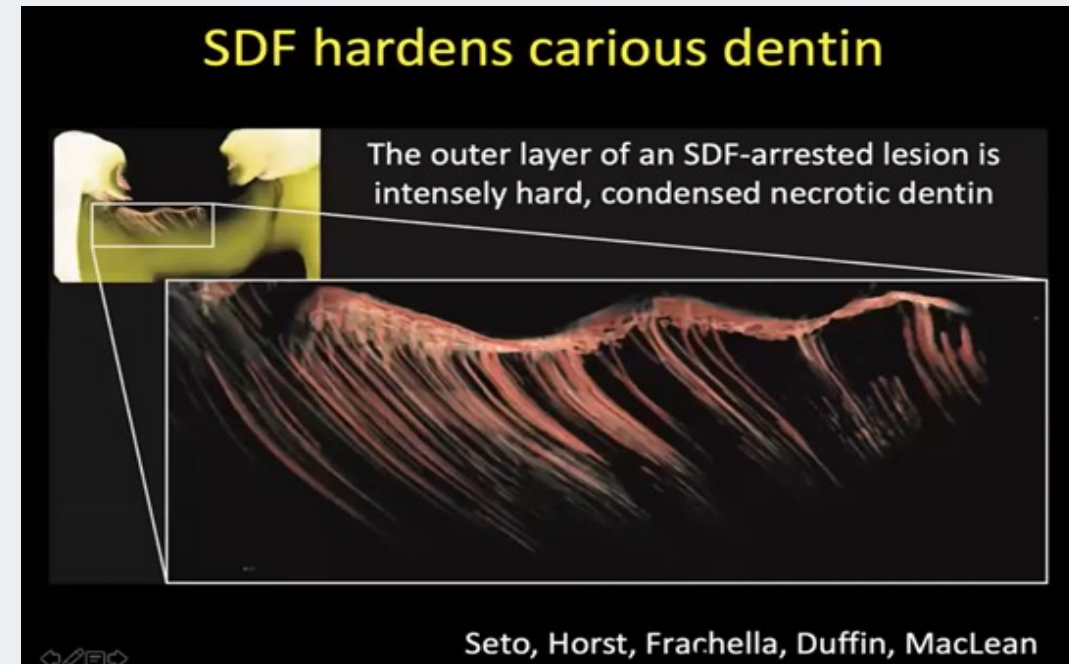
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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

SDF is a basic solution (pH of 10-12) with a 38% w/v $\text{Ag}(\text{NH}_3)_2\text{F}$. The silver functions as an antimicrobial, while fluoride is present in sufficient concentration to promote remineralization;^{2,3} the ammonia (NH_3) present stabilizes the solution.¹

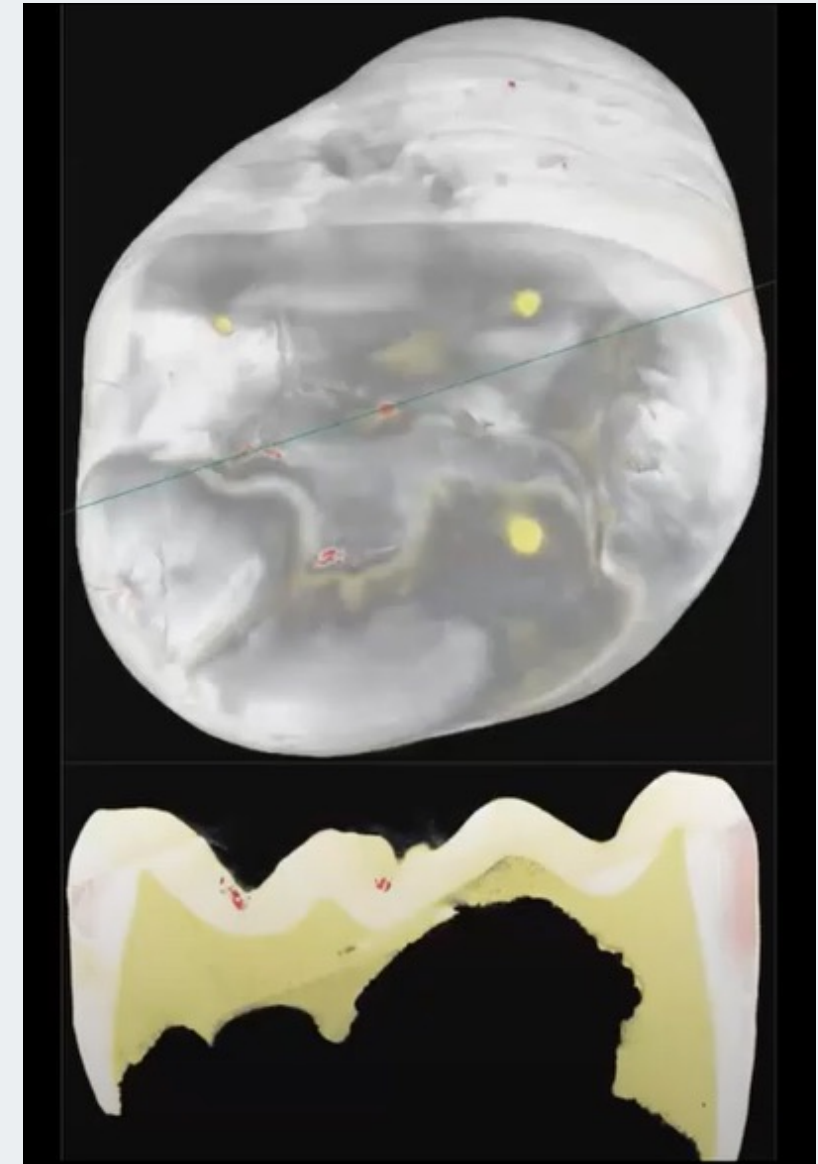
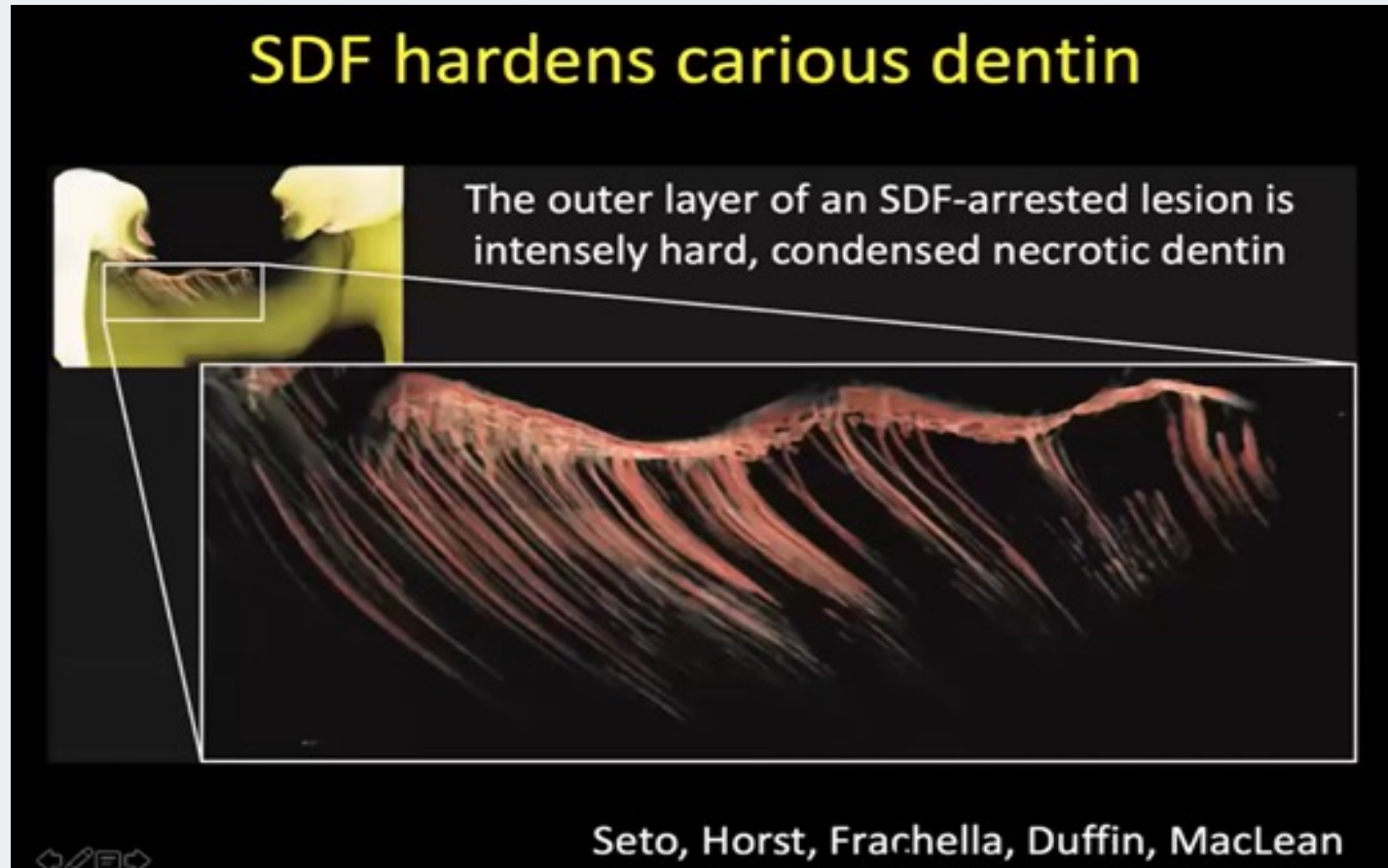
- 1.-Horst JA, Ellenikiotis H, Milgrom PL. UCSF protocol for caries arrest using silver diamine fluoride: rationale, indications and consent. J Calif Dent Assoc 2016;44(1):16-28.
- 2.Crystal YO, Niederman R. Evidence-Based Dentistry Update on Silver Diamine Fluoride. Dent Clin North Am 2019;63(1):45-68.
- 3.Meil ML, Lo ECM, Chu CH. Arresting Dentine Caries with Silver Diamine Fluoride: What's Behind It? J Dent Res 2018;97(7):751-58.



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Silver Diamine Fluoride (SDF):



Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride: What Is Its Place In Oral Healthcare?
(AAPD: SDF White Paper Final)

The black stained layer that has been associated with arrested dentin caries shows a hard and impermeable layer of silver phosphate that protects collagen exposure.

Chu, C. H., Mei, L., Seneviratne, C. J., & Lo, E. C. M. (2012). Effects of silver diamine fluoride on dentine carious lesions induced by *Streptococcus mutans* and *Actinomyces naeslundii* biofilms. *International Journal of Paediatric Dentistry*, 22(1), 2-10.



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https://www.aapd.org/assets/1/7/SDF_White_Paper_Final.pdf

Silver Diamine Fluoride (SDF):

The logo for the U.S. Food and Drug Administration (FDA), consisting of the letters "FDA" in white on a blue square background.

Although use of SDF has been reported in caries control and management, it is not specifically FDA-labeled for use for this indication (i.e., “off-label use”).

The U.S. Food and Drug Administration (FDA) has classified SDF as a Class II medical device and it is cleared for use in the treatment of tooth sensitivity, which is the same type of clearance as fluoride varnish and must be professionally applied.



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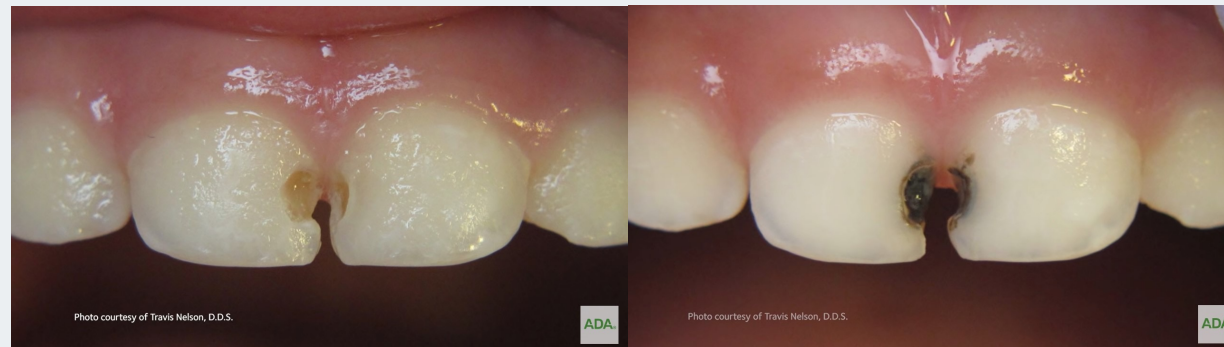
<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug,and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Safety?

Its potential downsides include a reportedly unpleasant metallic taste, potential to irritate gingival and mucosal surfaces, and the characteristic black staining of the tooth surfaces to which it is applied.

Mei ML, Lo EC, Chu CH. Clinical Use of Silver Diamine Fluoride in Dental Treatment. *Compend Contin Educ Dent* 2016;37(2):93-8; quiz100.



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Safety?

With respect to patient concerns about fluoride, there is less fluoride content in the amount of SDF used to treat a tooth with caries than in fluoride varnish. The American Academy of Pediatric Dentistry (AAPD) reports no known systemic or serious adverse effects reported for SDF when used according to manufacturer directions.

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. American Academy of Pediatric Dentistry 2017. http://www.aapd.org/media/Policies_Guidelines/G_SDF.pdf. Accessed October 5, 2020.





Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride: What Is Its Place In Oral Healthcare?
(AAPD: SDF White Paper Final)

Safety?

The use of SDF has been contraindicated in children with stomatitis, ulcerative gingival conditions, and silver allergies. To date there have been no reported adverse effects for its use in treating dental caries.

Sarvas, E., & Karp, J. M. (2016). Silver diamine fluoride arrests untreated dental caries but has drawbacks. AAP News.



Silver Diamine Fluoride (SDF):

Safety?

Contraindications: This product is contraindicated in patients with ulcerative gingivitis or stomatitis, or known sensitivity to silver or other heavy-metal ions. Patients with more than six affected sites, patients having had full mouth gingivectomies and patients showing abnormal skin sensitization in daily circumstances are recommended for exclusion.



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Advantage Arrest™

Silver Diamine Fluoride 38%
Professional Tooth Desensitizer

Rx Only

Desensitizing Ingredient: Aqueous Silver Diamine Fluoride, 38.3% to 43.2% w/v

Inactive Ingredients: Purified water, FD&C Blue 1

Clinical Pharmacology: Product forms insoluble precipitates with calcium or phosphate in the dentinal tubules to block nerve impulses.

Indication and Usage: Treatment of dentinal hypersensitivity. For use in adults over the age of 21.

Contraindications: This product is contraindicated in patients with ulcerative gingivitis or stomatitis, or known sensitivity to silver or other heavy-metal ions. Patients with more than six affected sites, patients having had full mouth gingivectomies and patients showing abnormal skin sensitization in daily circumstances are recommended for exclusion.

Warnings: This product is intended for local application only. Not for ingestion. Protect the patient's eyes. Use caution to avoid contact with skin or clothing. In the event of exposure to eyes or skin, flush the area copiously with water and immediately seek medical consultation. This product yielded positive cytotoxicity in standard testing.

<https://www.elevateoralcare.com/Application-Downloads>

Silver Diamine Fluoride (SDF):

f t y in 877-866-9113



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Product & Company Downloads

ITEM NAME	DESCRIPTION	
Advantage Arrest Silver Diamine Fluoride 38% Directions for Use	Download the Advantage Arrest Silver Diamine Fluoride 38% Directions for Use.	DOWNLOAD
Advantage Arrest Silver Diamine Fluoride 38% Information Sheet (English)	Download the Advantage Arrest Silver Diamine Fluoride 38% information sheet.	DOWNLOAD
Advantage Arrest Silver Diamine Fluoride 38% Information Sheet (Español)	Download the Advantage Arrest Silver Diamine Fluoride 38% information sheet.	DOWNLOAD
Advantage Arrest Silver Diamine Fluoride 38% Safety Data Sheet	Download the Advantage Arrest Silver Diamine Fluoride 38% Safety Data Sheet.	DOWNLOAD
Advantage Arrest Silver Diamine Fluoride 38% GEL Safety Data Sheet	Download the Advantage Arrest Silver Diamine Fluoride 38% GEL Safety Data Sheet.	DOWNLOAD
AllDay Dry Mouth Spray Safety Data Sheet	Download the AllDay Dry Mouth Spray Safety Data Sheet.	DOWNLOAD
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<https://www.elevateoralcare.com/Application-Downloads>

Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride: What Is Its Place In Oral Healthcare?
(AAPD: SDF White Paper Final)

Effectiveness?

Topical sodium fluoride (22,600ppm) application has been proven to have the ability to arrest dentin caries. Recent systematic reviews of human clinical trials have shown that SDF has greater anticariogenic effects than fluoride alone and therefore is more effective in arresting caries than fluoride varnish.

Beltrán-Aguilar, E. D. (2010, June). Silver Diamine Fluoride (SDF) may be Better than Fluoride Varnish and no Treatment in Arresting and Preventing Cavitated Carious Lesions. *Journal of Evidence Based Dental Practice*, 10(2), 122-124. doi:10.1016/j.jebdp.2010.02.014



Silver Diamine Fluoride (SDF):

Effectiveness?



Journal of Indian Society of
Pedodontics and Preventive Dentistry

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ORIGINAL ARTICLE

Outline
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Evaluation of the clinical efficacy of 38% silver diamine fluoride in arresting dental caries in primary teeth and its parental acceptance

Chaurasiya, Aparna; Gojanur, Sushma

Author Information

Journal of Indian Society of Pedodontics and Preventive Dentistry 39(1):p 85-89, Jan-Mar 2021. | DOI: 10.4103/jisppd.jisppd_34_21

Discussion

The present study was carried out to evaluate the clinical efficacy of biannual application of 38% SDF solution followed by 5% NaF varnish in arresting active carious lesions in the primary teeth of children aged 2–5 years. **Our results showed that SDF was 92.31% effective in arresting the carious lesions at 12-month follow-up.** All the parents involved in the study accepted the SDF treatment in their children. Zhi *et al.*^[10] found that biannual application of 38% SDF was 91% effective in arresting carious lesions.

https://journals.lww.com/jped/Fulltext/2021/39010/Evaluation_of_the_clinical_efficacy_of_38_silver.15.aspx#:~:text=Our%20results%20showed%20that%20SDF,effective%20in%20arresting%20carious%20lesions.



Silver Diamine Fluoride (SDF):

Effectiveness?

Think of this study in light of your own clinical practice!



Twenty-six children of age 2–5 years with 107 carious lesions were enrolled in the study. Four children with 15 carious lesions dropped out at the first recall visit at 3 weeks. Twenty-two children with 92 lesions completed the study. One hundred percent of lesions were black and hard so were considered arrested after one application at 3 weeks. 94.57% carious lesions were arrested at the second recall visit by the end of 3 months, five lesions were turned brown and still soft were considered not arrested. These five lesions were treated with a second application of SDF. 95.61% caries were arrested at third recall by the end of 6 months, one lesion excluded from the further analysis as it got fractured due to trauma. 92.31% carious lesions were arrested at the fourth recall visit by the end of 12 months, seven lesions were turned brown and still soft were considered not arrested.



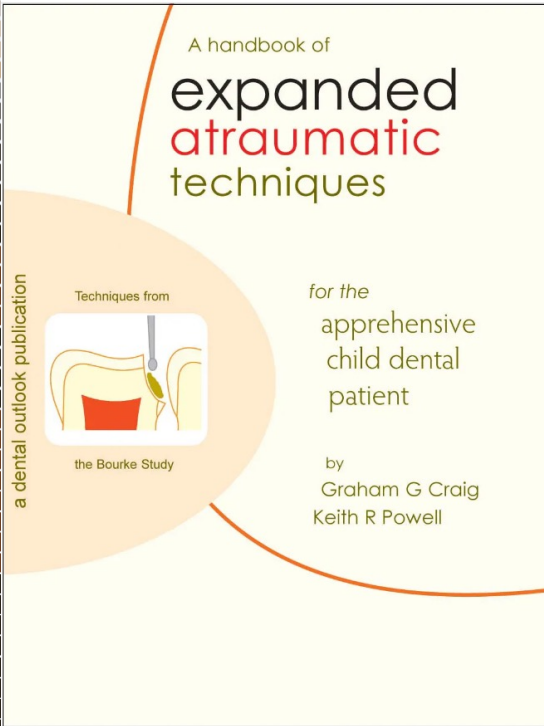
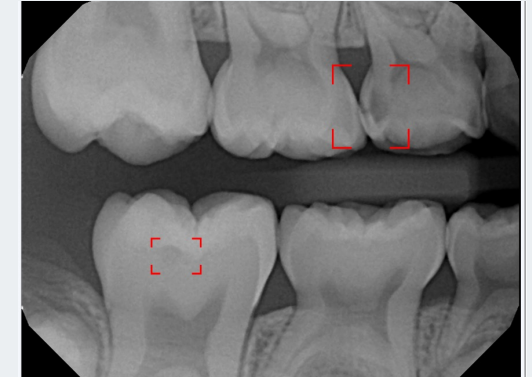
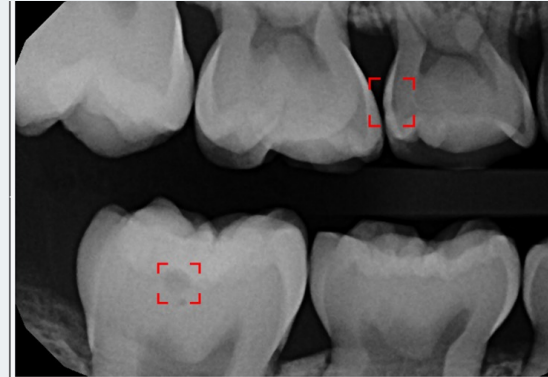
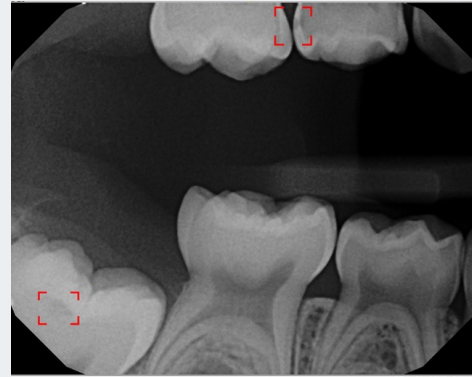
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https://journals.lww.com/jped/Fulltext/2021/39010/Evaluation_of_the_clinical_efficacy_of_38_silver.15.aspx#:~:text=Our%20results%20showed%20that%20SDF,effective%20in%20arresting%20carious%20lesions.

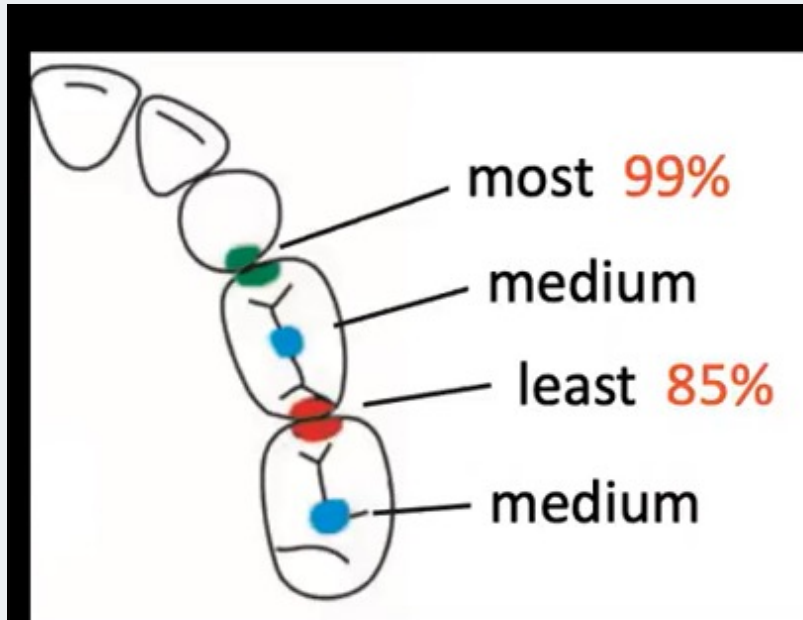
2018

2021

2022



Likelihood of SDF Caries Arrest = Cleansability



Craig and Powell,
Dental Outlook. 2013



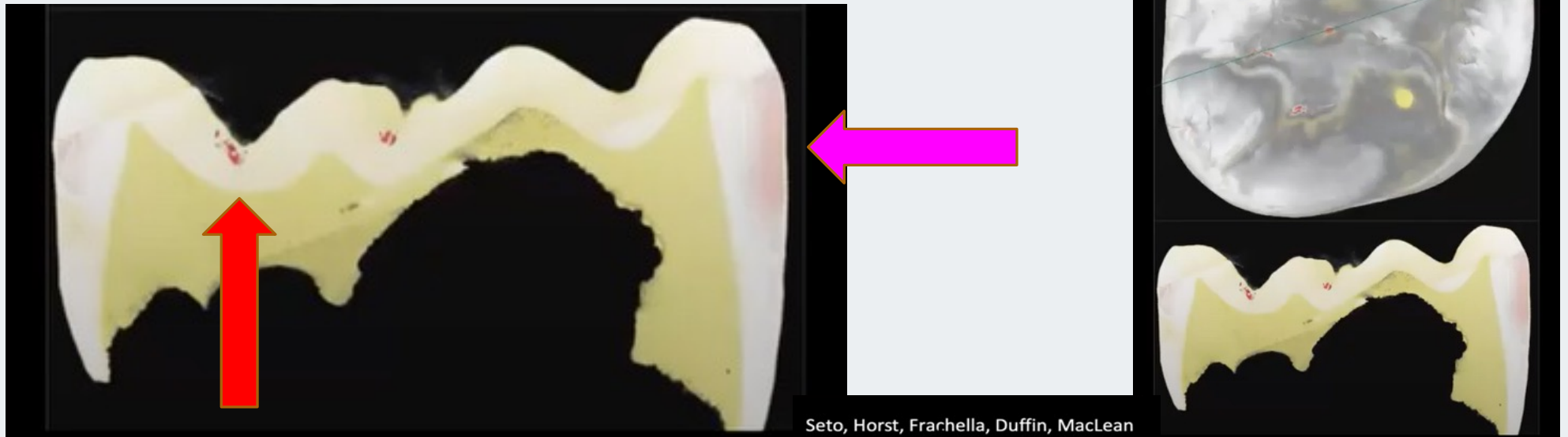
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Silver Diamine Fluoride (SDF):

Effectiveness?

When applied to a carious lesion, SDF has also been shown to decrease caries risk of adjacent tooth surfaces. (ADA)

Llodra JC, Rodriguez A, Ferrer B, et al. Efficacy of silver diamine fluoride for caries reduction in primary teeth and first permanent molars of schoolchildren: 36-month clinical trial. J Dent Res 2005;84(8):721-4.



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Effectiveness?

A 2019 systematic review by Horst et al. found that once-yearly SDF application was more effective in preventing caries than more frequent application (i.e., 2 to 4 times yearly) of fluoride varnish. Whereas when compared to occlusal sealants, SDF was only more effective in preventing caries if continuously applied.

Horst JA, Heima M. Prevention of Dental Caries by Silver Diamine Fluoride. *Compend Contin Educ Dent* 2019;40(3):158-63; quiz 64.

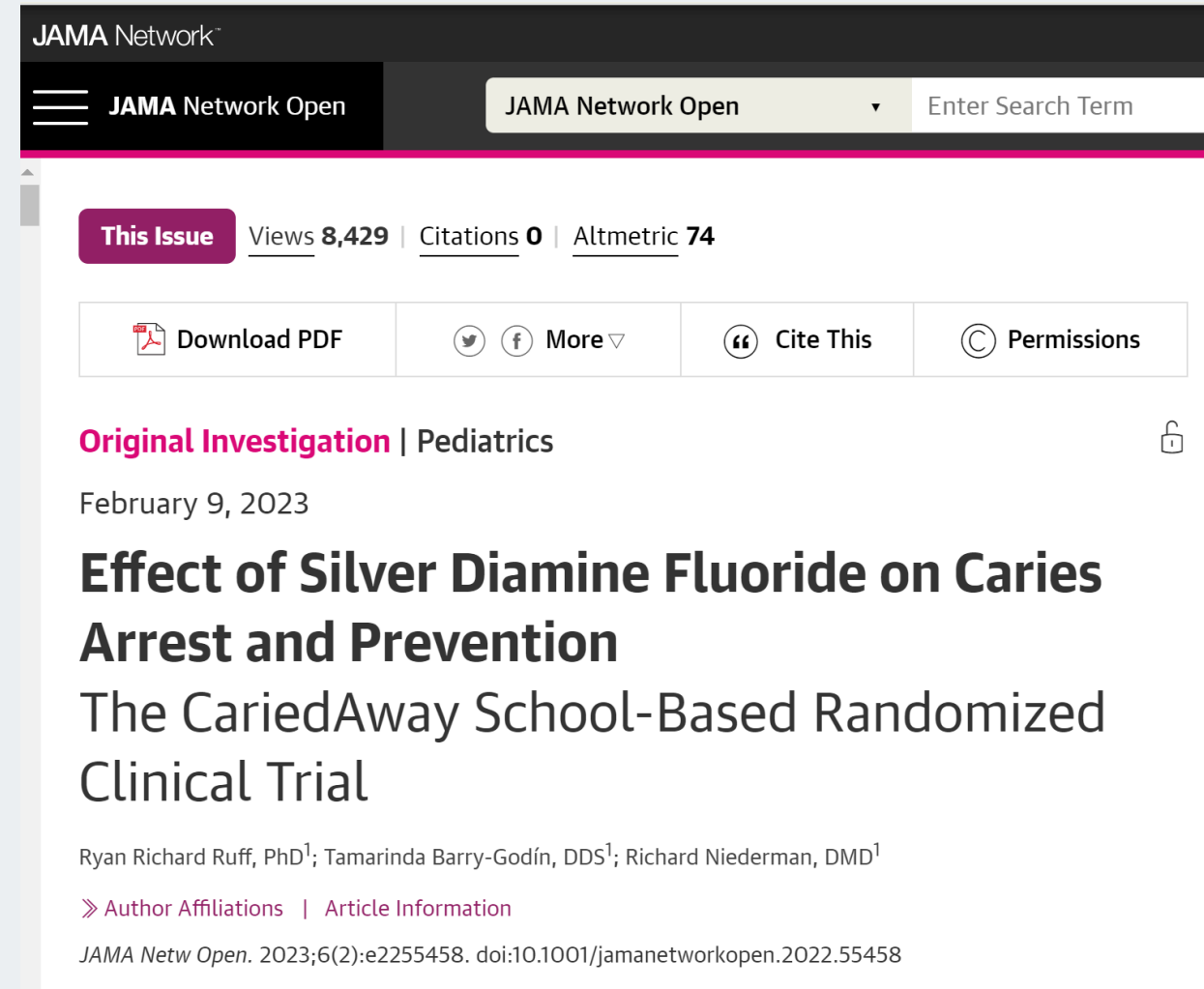


Silver Diamine Fluoride (SDF):

Effectiveness?

Conclusions and Relevance In this randomized clinical trial, silver diamine fluoride with fluoride varnish was noninferior to sealants and atraumatic restorations with fluoride varnish for caries arrest and prevention. Results may support the use of silver diamine fluoride as an arresting and preventive agent in school-based oral health programs.

?????



The screenshot shows the JAMA Network article page. At the top, it says 'JAMA Network' and 'JAMA Network Open'. Below that, there's a search bar with 'Enter Search Term'. The article title is 'Effect of Silver Diamine Fluoride on Caries Arrest and Prevention' and the subtitle is 'The CariedAway School-Based Randomized Clinical Trial'. The authors listed are Ryan Richard Ruff, PhD¹; Tamarinda Barry-Godín, DDS¹; Richard Niederman, DMD¹. The article is categorized as 'Original Investigation | Pediatrics' and was published on February 9, 2023. It has 8,429 views, 0 citations, and an Altmetric score of 74. There are buttons for 'Download PDF', 'More', 'Cite This', and 'Permissions'. The URL at the bottom is <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2801193>.



Silver Diamine Fluoride (SDF):

Effectiveness?

SDF has also shown efficacy in management of root caries in the elderly.

1. Li R, Lo EC, Liu BY, Wong MC, Chu CH. Randomized clinical trial on arresting dental root caries through silver diamine fluoride applications in community-dwelling elders. *J Dent* 2016.
2. Zhang W, McGrath C, Lo EC, Li JY. Silver diamine fluoride and education to prevent and arrest root caries among community-dwelling elders. *Caries Res* 2013;47(4):284-90.
3. Hendre AD, Taylor GW, Chavez EM, Hyde S. A systematic review of silver diamine fluoride: Effectiveness and application in older adults. *Gerodontology* 2017;34(4):411-19.



John McDowell, DDS



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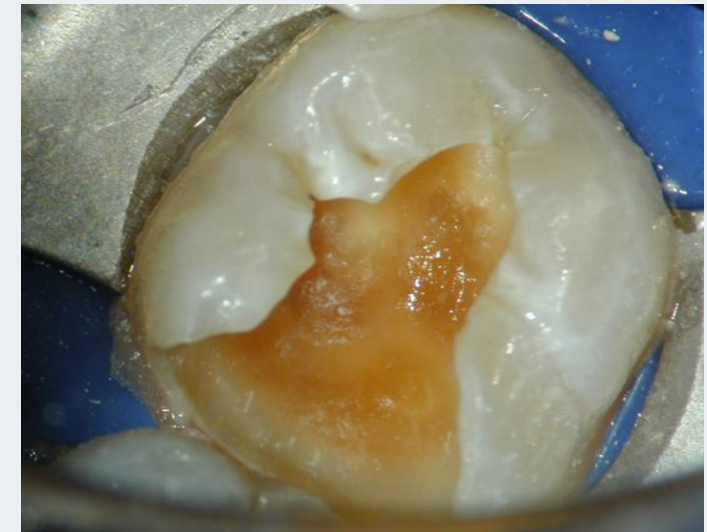
Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride: What Is Its Place In Oral Healthcare?
(AAPD: SDF White Paper Final)

Effectiveness?

Studies have shown that SDF does not induce inflammation or necrosis of the pulp and adequate tertiary dentin can be induced, therefore, making it a potentially adequate indirect pulp therapy material for deep cavities

Korwar, A., Sharma, S., Logani, A., & Shah, N. (2015, July 31). Pulp response to high fluoride releasing glass ionomer, silver diamine fluoride, and calcium hydroxide used for indirect pulp treatment: An invivo comparative study. 6(3), 288-292. Retrieved September 15, 2016, from <http://www.contempclindent.org/article.asp?issn=0976-237X;year=2015;volume=6;issue=3;spage=288;epage=292;aulast=Korwar>



Silver Diamine Fluoride (SDF):

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Effect of silver diamine fluoride solution application on the bond strength of dentine to adhesives and to glass ionomer cements: a systematic review

[Meng Jiang](#), [May Lei Mei](#), [May Chun Mei Wong](#), [Chun Hung Chu](#) & [Edward Chin Man Lo](#) 

[BMC Oral Health](#) **20**, Article number: 40 (2020) | [Cite this article](#)

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Silver Diamine Fluoride (SDF):

Results

A total of 13 articles were included in this review, with 8 and 6 studies investigating the effect of SDF application on the bond strength of dentine to various adhesives and to GICs, respectively. Sound dentine as well as demineralized dentine created by chemical methods, e.g. immersing in a demineralizing solution, was commonly adopted as the testing dental substrate. The microtensile bond strength (mTBS) test was the predominant method employed. However, the bond strength values had large variations among studies, ranging from <10 to 162 Mpa.

Regarding the bond strength to different adhesives, 4 studies indicated that SDF application followed by rinsing with water had no significant influence. However, another 4 studies reported reduced bond strength after SDF application. Regarding the bond strength to GICs, 4 studies concluded that SDF application had no adverse impact on the bond strength.

Conclusions

No solid conclusion can be drawn on the effect of SDF application on the bond strength of dentine to adhesives and to GICs due to the high degree of variation of the included studies.



Silver Diamine Fluoride (SDF):



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Meta-Analysis > J Adhes Dent. 2022 Mar 1;24(1):29-38. doi: 10.3290/j.jad.b2701679.

Bonding of Glass-Ionomer Cement and Adhesives to Silver Diamine Fluoride-treated Dentin: An Updated Systematic Review and Meta-Analysis

Tatiana Tambara Fröhlich, Graziela Botton, Rachel de Oliveira Rocha

PMID: 35227044 DOI: 10.3290/j.jad.b2701679



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<https://pubmed.ncbi.nlm.nih.gov/35227044/>

Silver Diamine Fluoride (SDF):

Results


Twenty-two studies, including 11 new studies not included in our previous systematic review, met the eligibility criteria, and 21 studies were considered in the meta-analyses. SDF dentin pretreatment did not influence the bonding of GIC ($Z = 0.53$; $p = 0.60$), independent of dentin condition. SDF treatment significantly impaired the bonding of AD ($Z = 2.43$; $p = 0.01$). A rinsing step after SDF eliminated this effect in sound dentin ($Z = 1.82$; $p = 0.07$) and increased the bond strength to caries-affected dentin ($Z = 2.14$; $p = 0.03$).


Conclusion

SDF pretreatment does not influence the bond strength of GIC. A rinsing step after SDF application can improve the bond strength of AD to caries-affected dentin.



Silver Diamine Fluoride (SDF):

 National Library of Medicine
National Center for Biotechnology Information



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> [Am J Dent](#). 2018 Dec;31(6):317-319.

Silver diamine fluoride and bond strength to enamel in vitro: A pilot study

Katie J Camacho ¹, Jeryl D English ², Helder B Jacob ², Lacey M Harris ², F Kurtis Kasper ², Harry I Bussa ², Ryan L Quock ³

Affiliations + expand
PMID: 30658379

Abstract

Purpose: To evaluate if pre-treatment with silver diamine fluoride (SDF) adversely affects the bond strength of orthodontic brackets to enamel.



Silver Diamine Fluoride (SDF):

Results: No significant difference in shear bond strength to enamel was observed between the control and experimental groups (P= 0.65). Comparison of ARI did demonstrate a significant difference between the groups (P= 0.013); SDF significantly altered the characteristic of bond failure, resulting in more adhesive remaining bonded to enamel after failure. No silver staining of treated surfaces was observed.

Clinical significance: The application of SDF to etched non-carious enamel in vitro prior to orthodontic bracket bonding does not adversely affect bond strength.



Silver Diamine Fluoride (SDF):

Application

Practice Informed Consent

- Explain potential side effects.
- Ensure patients and caregivers are aware of all nonrestorative and restorative treatment options available.

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Silver Diamine Fluoride (SDF):

Application



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Silver Diamine Fluoride (SDF):

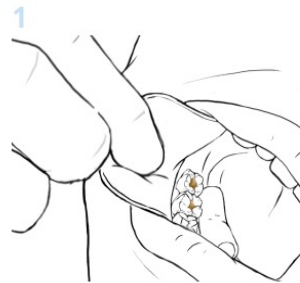
Application

HOW TO

apply Silver Diamine Fluoride (SDF) to initial, moderate, or advanced caries lesions.

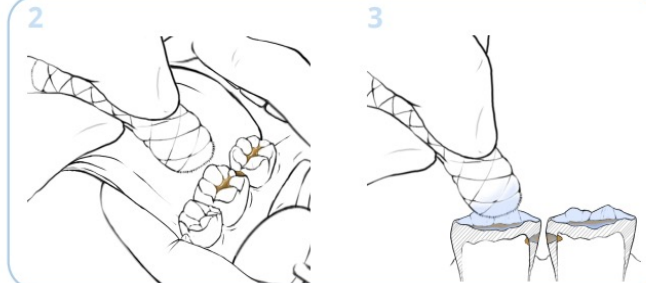


Isolate



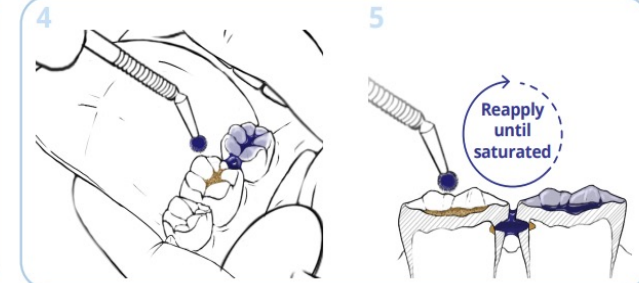
Isolate the teeth with cotton. Protect the eyes.

Dry



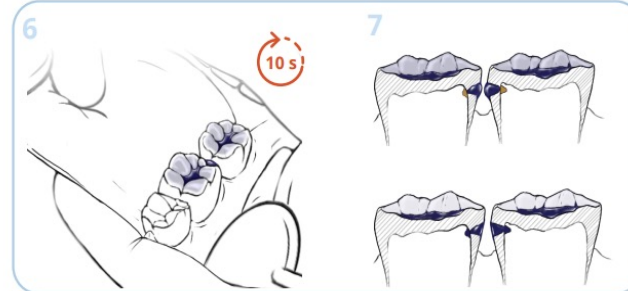
Dessicate with air.
For no aerosols, thoroughly dry with cotton.
Keep mouth open.

Apply



Apply to dry caries lesions; repeat until lesion is SDF-saturated. Be careful of dripping.
If treating approximal surfaces, apply to embrasures, so SDF wraps around the contact area. Unwaxed floss can be used.

Wait



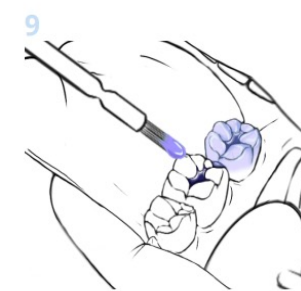
Allow at least 10 seconds for SDF to absorb. During this time, it will seep deeper into the caries lesion through capillary action.
Do not rinse. Do not blow compressed air.

Remove excess



Remove excess with cotton.

Protect



Option 1: cover the treated areas with fluoride varnish or petroleum jelly (e.g. Vaseline), then remove cotton.
Option 2: protect from saliva for 1 minute, then remove cotton.



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Silver Diamine Fluoride (SDF):

Silver Diamine Fluoride: What Is Its Place In Oral Healthcare? (AAPD: SDF White Paper Final)

Billing Code Procedure: SDF was approved by the Code on Dental Procedures and Nomenclature Code Maintenance Commission under **D1354** as an “interim caries arresting medication application”. The definition is: “Conservative treatment of an active non-symptomatic carious lesion by topical application of a caries arresting or inhibiting medicament and without mechanical removal of sound tooth structure”⁵.

5. Featherstone, J. D., PhD, & Horst, J. A., DDS, MS, PhD. (2015, October 5). Long used in other countries, silver diamine fluoride is now cleared for use in the U.S. While there is an assumption of use for pediatric caries control, here we explore indications for adults. The Journal of Multidisciplinary Care Decisions in Dentistry, 1-8. Retrieved from Pubmed.



Cathy Boyce, Dr. Jeanette MacLean



Silver Diamine Fluoride (SDF):

D1355 ADA Guide – Version 2 – September 01, 2021 – Page 1 of 3
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D1355 – ADA Guide to Reporting Caries Preventive Medicament Application

This guide is to educate dentists and others in the dental community on the procedure and its code, first published in *CDT 2021*.

Billing Code



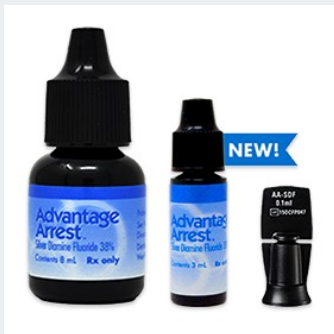
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https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/publications/cdt/d1355_adaguidetoreportingcariespreventivemedicamentapplication_2021aug.pdf?rev=325c43aa41164c5ea0d62b569a837d5a&hash=687ED0299EF3DFFDA9FD087E225914B7

Silver Diamine Fluoride (SDF):

Application

Dosage and Administration: 1. Isolate the affected area of the tooth with cotton rolls or protect the gingival tissue of the affected tooth with petroleum jelly. Alternatively, a rubber dam can be used to isolate the area. 2. Clean and dry the affected tooth surface. 3. For up to 5 treated sites per patient, dispense 1-2 drops of solution into a disposable dappen dish. Transfer material directly to the tooth surface with an applicator. 4. Allow to air dry, do not rinse. **If needed, one or two reapplications may be administered at intervals of one week.**



Dosage and Administration:

1. Isolate the affected area of the tooth with cotton rolls or protect the gingival tissue of the affected tooth with petroleum jelly. Alternatively, a rubber dam can be used to isolate the area.
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4. Allow to air dry, do not rinse.

If needed, one or two reapplications may be administered at intervals of one week.

How Supplied: Single 10 mL dropper-bottle containing 8 mL of product. Not sterile.

Storage: Do not freeze or expose to extreme heat. Keep in an air-tight container in a dark place.

Caution: Federal law restricts this device to sale by or on the order of a dentist or physician.

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<https://www.elevateoralcare.com/Application-Downloads>

Silver Diamine Fluoride (SDF):

Application

Advantage Arrest Silver Diamine Fluoride 38% GEL - Unit-Dose Ampules

Advantage Arrest® GEL, the world's first viscous silver diamine fluoride.

Have confidence as the GEL is more easily controlled and will stay where it's applied. Worry less about staining adjacent areas, accidental drips, and flowing to unintended sites.



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<https://www.elevateoralcare.com/products/AdvantageArrest/Advantage-Arrest-GEL>

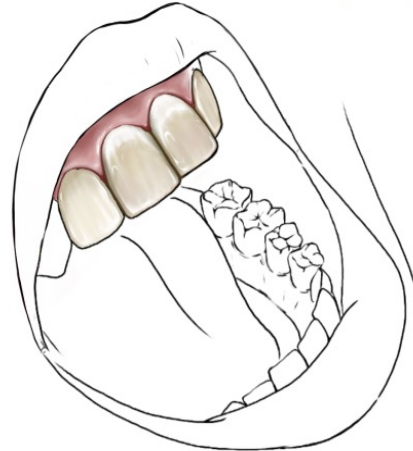
Silver Diamine Fluoride (SDF):

Application

HOW TO

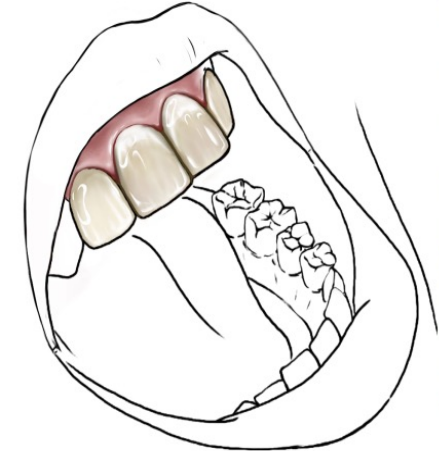
differentiate **Active vs. Arrested** caries lesions by visual-tactile assessment of surface texture and topography.

ACTIVE non-cavitated lesions (*initial*)



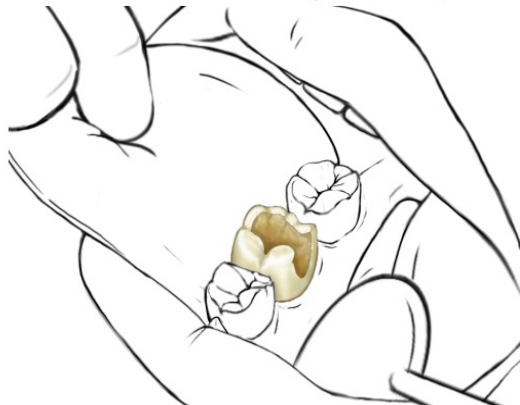
- No surface breakdown, yet. Demineralization can go into the outer 1/3 of dentin.
- Usually plaque-covered (assess *before* cleaning).
- Can be white or yellow.
- Active facial / buccal lesions typically reach the gumline.
- On posterior teeth, chalky white or yellow areas extend out of the fissures.
- Chalky, no shine upon drying.
- Feels bumpy and soft when gently dragging the end of a blunt instrument across the lesion.
- Radiographs may show demineralization in the outer third of dentin, but without cavitation dentin is not infected.

ARRESTED non-cavitated lesions (*initial*)



- No surface breakdown.
- Usually plaque-free. (assess *before* cleaning).
- Can be white, brown, or black.
- Arrested facial / buccal lesions typically do not reach the gumline.
- On posterior teeth, no chalky white or yellow areas extending out of fissures. May have dark staining.
- Shiny upon drying.
- Feels smooth and hard when gently dragging the end of a blunt instrument across the lesion.

ACTIVE cavitated lesion (*moderate, advanced*)



- Easily visible cavitation. The hole breaches the dentin. Usually the demineralization reaches the middle or inner 1/3 of dentin.
- Usually plaque-covered (assess *before* cleaning).
- White, yellow, or light brown and often dull = bacterial growth.
- Feels soft or leathery when gently dragging the end of a blunt instrument across the lesion.

ARRESTED cavitated lesion (*moderate, advanced*)



- Cleansable lesions are much more likely to arrest than lesions with plaque traps.
- Easily visible cavitation. The hole breaches the dentin.
- Usually plaque-free. (assess *before* cleaning).
- Amber to dark brown or black and often shiny = no bacteria.
- Feels smooth and hard when gently dragging the end of a blunt instrument across the lesion.



Silver Diamine Fluoride (SDF):

Follow Up



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Follow Up

Follow Up

- Carious lesions should be re-treated with SDF every six months or annually.
- Patients should be monitored periodically throughout the course of treatment.
- Lesion hardness is the definitive outcome.

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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Silver Diamine Fluoride (SDF):

Follow Up

Single application of SDF has been reported to be insufficient for sustained benefit and requires reapplication.

Horst JA, Ellenikotis H, Milgrom PL. UCSF protocol for caries arrest using silver diamine fluoride: rationale, indications and consent. J Calif Dent Assoc 2016;44(1):16-28.



Silver Diamine Fluoride (SDF):

Follow Up

Minimize Future Caries Risk

- **Talk with patients about how home care can help minimize the need for future treatment.**

ADA[®]



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<https://www.ada.org/resources/research/science-and-research-institute/oral-health-topics/silver-diamine-fluoride#:~:text=The%20U.S.%20Food%20and%20Drug, and%20must%20be%20professionally%20applied.>

Document

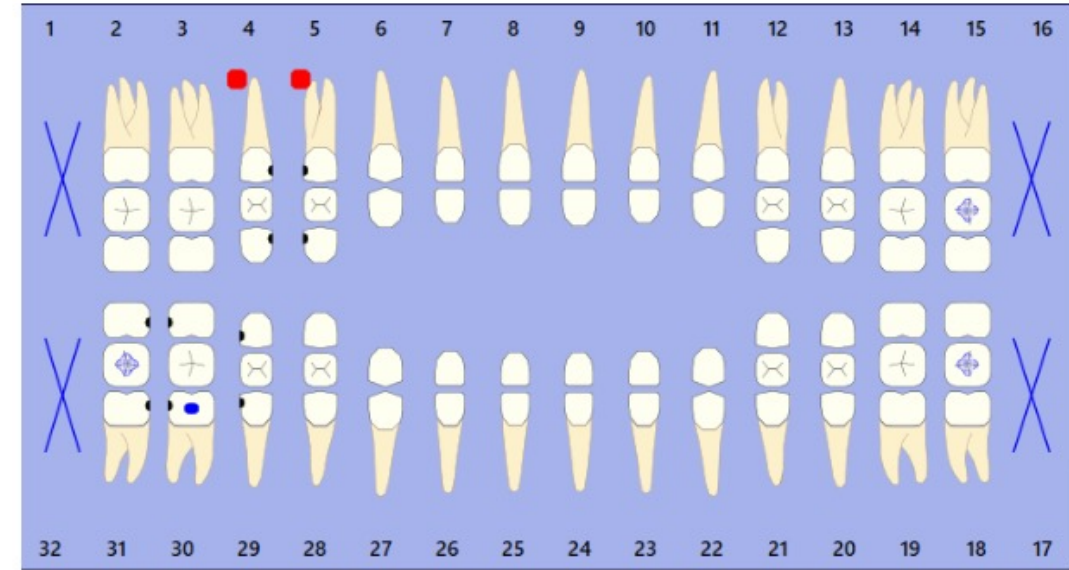
We rely a lot on the EDR odontogram to tell a story. Visually we gather a lot of information and here is an example of a clinic (Grand Ronde) using a tool in their EDR to designate the planning and the treatment using SDF.

We need more tools to simplify the CRA process and the Management of Caries.

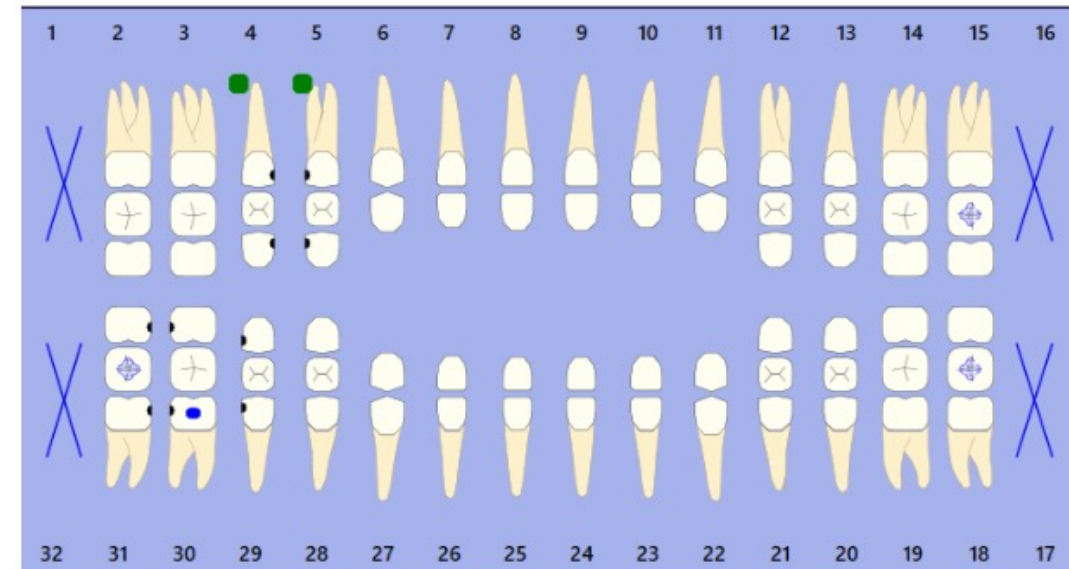


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- Red dot: Teeth planned for SDF treatment



- Green dots: Teeth treated with SDF



Povidone Iodine (PI):



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ORAL CARE®

When Fluoride alone isn't enough...

Povi-One™
10% Povidone-Iodine
Oral Antiseptic

Povi-One™ 10% Povidone Iodine Oral Antiseptic
is Now Available – Exclusively from Elevate Oral Care®

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Dr. Jeremy Horst Keeper

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Povidone Iodine (PI):

Povidone iodine is a mixture of polyvinylpyrrolidone (povidone, PVP, 9% w/v) and iodine (1% w/v), and water (90% w/v). Povidone itself is not biologically active. The combination came into commercial use in the United States in 1955 and is available globally over the counter. Being safe, effective, and inexpensive has placed it on the World Health Organization (WHO) List of Essential Medicines. Povidone iodine has a broad spectrum of clinical activity against bacteria, yeasts, parasites, and viruses.³⁻⁶

3. Eggers M. Infectious Disease Management and Control with Povidone Iodine. *Infect Dis Ther.* 2019;8(4):581-593.
4. Gershenfeld L. Povidone-iodine (PVP-I) as a trichomonacide. *Am J Pharm Sci Support Public Health.* 1962;134:324-331.
5. Gershenfeld L. Povidone-iodine (PVP-I) as a vaginal microbicide. *Am J Pharm Sci Support Public Health.* 1962;134:278-291.
6. Gershenfeld L. Povidone-iodine as a sporicide. *Am J Pharm Sci Support Public Health.* 1962;134:78-81.



Povidone Iodine (PI):

Safety?

FDA Regulation

Since 1991, the FDA has categorized 5-10% povidone iodine as a safe and effective topical over-the-counter first aid antiseptic and as a patient preoperative skin preparation (56 FR 33644, 82 FR 60474).

Professional Application in the Office and Dispensing Topical Povidone Iodine for Home Use to Manage Dental Caries in Children and Adults

Jeremy A Horst DDS, PhD

Affiliate Instructor, University of Washington
School of Dentistry Department of Oral Health Sciences
Pediatric Dentist, private practice
jahorst@gmail.com

Jeremy Horst is a practicing pediatric dentist and biochemist affiliated with University of Washington and UC San Francisco known for investigating the strengths and limitations of silver fluoride therapy and helping to develop SMART fillings. His mission is to reduce suffering from tooth decay by driving the development of better treatments and preventives. In his teaching and clinical [practice](#) he focuses on minimally invasive maximally effective techniques to stop dental caries and create an easy relationship to dentistry for children and people with special healthcare needs or uncontrolled caries.

Peter Milgrom DDS

Professor Emeritus, University of Washington School of Dentistry Department of Oral Health Sciences
dfrc@uw.edu

Peter Milgrom is an internationally recognized dentist clinician and researcher with academic appointments at the University of Washington, University of Michigan, Case Western University, and the University of Rochester and a professional career spanning nearly 50 years. He is the author of more than 325 research articles and multiple books. Among his achievements have been the introduction of silver diamine fluoride into the United States and the development of a fluoride varnish with iodine that is currently under consideration by the US Food and Drug Administration. His work has been recognized by many international awards.



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Povidone Iodine (PI):

Safety?

Package leaflet: Information for the user

Betadine Gargle and Mouthwash 10mg/ml Oral Solution Povidone Iodine

Read all of this leaflet carefully because it contains important information for you.

This medicine is available without prescription. However, you still need to use Betadine Gargle and Mouthwash carefully to get the best results from it.

- Keep this leaflet. You may need to read it again.
- Ask your pharmacist if you need more information or advice
- You must contact your doctor if your symptoms worsen or do not improve
- If any of the side effects become serious, or if you notice any side effects not listed in this leaflet, stop using Betadine Gargle and Mouthwash straightaway and tell your doctor or pharmacist.

For US Residents Only

BETADINE
ANTISEPTIC

First Aid Sore Throat FAQs Coupons COVID-19 Response

BETADINE[®]

ANTISEPTIC SORE THROAT GARGLE

Treat and relieve sore throat symptoms with the trusted power of iodine



The image shows a blue plastic bottle and a blue cardboard box for Betadine Antiseptic Sore Throat Gargle. The bottle is labeled 'BETADINE ANTISEPTIC Sore Throat Medicated Gargle' and '8 FL OZ (237 mL)'. The box is labeled 'BETADINE ANTISEPTIC Sore Throat Medicated Gargle' and '8 FL OZ (237 mL)'. The box also features a diagram of a throat and lists benefits: 'Treats', 'Relieves', and 'Fast Acting'. A 'Mint' flavor indicator is also present.

MIMS home / Drugs / Info



Betadine Gargle & Paint/Betadine Throat Spray

povidone iodine

Manufacturer: **Mundipharma**

Distributor: **Zuellig**



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Povidone Iodine (PI):

SAFETY?

Dental providers need to be prepared to explain the safety of povidone iodine to patients as they are unlikely to have heard about this treatment in a dental office previously.

Allergies to povidone iodine are rare although topical reactions have been observed on skin. Mild reactions in adults or children can be treated with diphenhydramine. Povidone iodine should not be used with individuals with known allergy or contact sensitivity to it or to contrast dyes or have Beta-Thalassemia major.

Seafood Allergy is Not a Contraindication to the Use of Povidone Iodine. The seafood-iodine misconception has been difficult to shed, because seafood contains higher levels of iodine than other foods. Instead, parvalbumins, tropomyosins, and other proteins cause seafood allergies.



Povidone Iodine (PI):

SAFETY?

A physician consultation should be obtained before using povidone iodine with individuals who have thyroid cancer, hypothyroidism, hyperthyroidism, thyroiditis, goiter, nodular thyroid, Graves disease, autoimmune thyroiditis, Hashimoto disease or diseases with common thyroid complexities or treatment with iodine such as dermatitis herpetiformis, cystic fibrosis, chronic lung disease, or hypocomplementemic vasculitis.

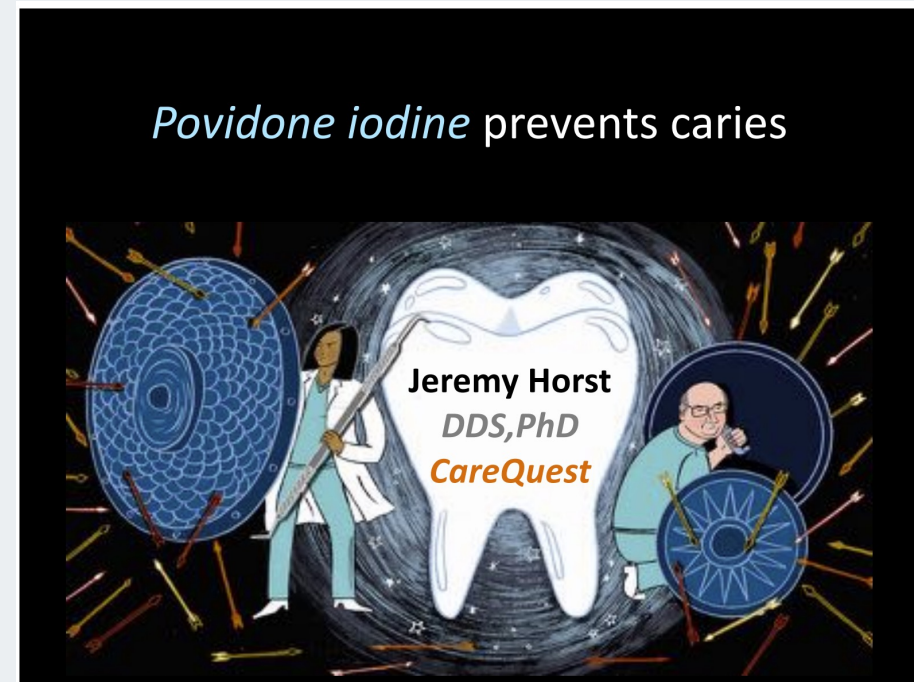
Caution is also indicated before using the product in patients with anorexia nervosa, patients who have been prescribed lithium therapy, or who are receiving chronic iodine supplementation or chronic dialysis.



Povidone Iodine (PI):

SAFETY? - Iodine contraindications

- Allergy to povidone iodine.
- Contact sensitivity to povidone iodine.
- Reactivity to iodine (usually during medical imaging).
- Beta-thalassemia major.
- Intraoral wound deeper than an abrasion (e.g. post-extraction before primary closure; delay).
- Advanced thyroid disease with severe iodine intake sensitivity.
- Connection to seafood allergy is a myth.



Povidone Iodine (PI):

SAFETY?

10% povidone iodine is 10% povidone iodine.



Home use directions

once every season

8 drops povidone iodine → shot glass.

Saturate 1 side of a Qtips swab, don't re-dip.

dose = $\leq 80\mu\text{L PI} = 800\mu\text{g Iodine} = \text{safe.}$

Povidone iodine prevents caries



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<https://sites.google.com/site/jeremyahorst/iodine-for-caries-management>

Povidone Iodine (PI):

Effectiveness?

Six controlled clinical studies show that povidone iodine applied every two to four months prevents, on average, 42% of new dental caries lesions when applied alone. The estimated combined preventive effect of povidone iodine when applied in sequence with fluoride varnish is 63%.

Professional Application in the Office and Dispensing Topical Povidone Iodine for Home Use to Manage Dental Caries in Children and Adults

Jeremy A Horst DDS, PhD

Affiliate Instructor, University of Washington
School of Dentistry Department of Oral Health Sciences
Pediatric Dentist, private practice
jahorst@gmail.com

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Peter Milgrom DDS

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Povidone Iodine (PI):

Effectiveness?

The six comparative clinical studies that continued periodic povidone iodine applications every two to four months all demonstrated considerable prevention compared to the control groups. Two of these studies involved application of sodium fluoride varnish immediately preceded by povidone iodine or not, in high risk patients.^{38,39} A recent study investigated the efficacy and safety of a novel sodium fluoride varnish also containing 10% povidone iodine.⁴⁰ The other three periodic application studies did not utilize a fluoride.^{37,41,42} The weighted mean prevented fraction for all six studies with continued applications after one month is 42%. For just the four that were randomized clinical trials the prevented fraction is 45%. Considering prevention by fluoride varnish,⁴³ this equates to a total prevented fraction as follows: $37\% + (1-37\%)*42\% = 63\%$.

37. [Amin MS, Harrison RL, Benton TS, Roberts M, Weinstein P. Effect of povidone-iodine on Streptococcus mutans in children with extensive dental caries. *Pediatr Dent.* 2004;26\(1\):5-10.](#)

38. [Milgrom PM, Tut OK, Mancl LA. Topical iodine and fluoride varnish effectiveness in the primary dentition: a quasi-experimental study. *J Dent Child.* 2011;78\(3\):143-147.](#)

39. [Tut OK, Milgrom PM. Topical iodine and fluoride varnish combined is more effective than fluoride varnish alone for protecting erupting first permanent molars: a retrospective cohort study. *J Public Health Dent.* 2010;70\(3\):249-252.](#)

40. [Milgrom P, Tut O, Rothen M, Mancl L, Gallen M, Tanzer JM. Addition of Povidone Iodine to Fluoride Varnish for Dental Caries: Randomized Clinical Trial. *JDR Clin Trans Res.* 2020; ePub ahead of print.](#)

41. [Simratvir M, Singh N, Chopra S, Thomas AM. Efficacy of 10% Povidone Iodine in children affected with early childhood caries: an in vivo study. *J Clin Pediatr Dent.* 2010;34\(3\):233-238.](#)

42. [Lopez L, Berkowitz R, Spiekerman C, Weinstein P. Topical antimicrobial therapy in the prevention of early childhood caries: a follow-up report. *Pediatr Dent.* 2002;24\(3\):204-206.](#)

43. [Marinho VCC, Worthington HV, Walsh T, Clarkson JE. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev.* 2013;\(7\):CD002279.](#)



Povidone Iodine (PI):

Effectiveness?

- Povidone Iodine kills S. mutans bacteria and in a greater quantity than other bacteria. And it suppresses bacteria for several months, dependent upon patient habits.
- Povidone Iodine also reduces glucan production, which is essential for polysaccharide production. Polysaccharides are what allows plaque to adhere to teeth.



<https://pubmed.ncbi.nlm.nih.gov/19486465/>

<https://pubmed.ncbi.nlm.nih.gov/20578661/#:~:text=Results%20revealed%20that%20application%20of,oral%20load%20of%20the%20organisms.>

<https://academic.oup.com/jac/article/57/5/865/764605?login=false>

<https://www.google.com/search?q=povi+one&oq=Povi+One&aqs=chrome.0.0i512j0i390i650l2j69i61j69i60l2.5370j0j7&sourceid=chrome&ie=UTF-8#fpstate=ive&vld=cid:04cd477c,vid:ht3ail0Rnko>



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Povidone Iodine (PI):

Application

HOW TO apply Povidone Iodine for caries prevention.

1 Dispense



Dispense 8 drops of 10% povidone-iodine.

2



Saturate one end of a cotton swab.
Note: To avoid too much iodine, do not re-dip after applying to teeth.

3 Dry



Ask the patient swallow. Use cotton or suction to remove excess saliva.

4 Apply



Roll the swab and push to release more iodine into high risk areas, like contact points and exposed roots.

5
open
10 s



Continue across all teeth. Keep mouth open for 10 seconds.

6 Optional fluoride varnish



Fluoride varnish may be applied.
Wait 30 minutes to eat or drink.

or

A Dispense



Screw the brush together.

B Dry



Ask the patient swallow. Use gauze or suction to remove excess saliva.

C



Squeeze to move the iodine into the brush.

D Apply



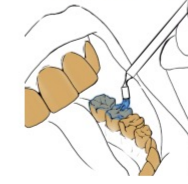
Brush on, focusing on high risk areas like contact points and exposed roots.

E
open
10 s



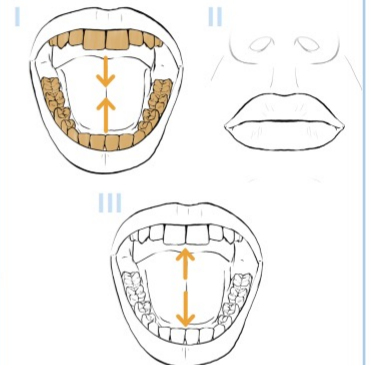
Continue across all teeth. Keep mouth open for 10 seconds.

F Optional fluoride varnish



Fluoride varnish may be applied after 10 seconds.
Wait 30 minutes to eat or drink.

Myths about povidone iodine



Myth: *It stains teeth.*
No! The temporary **color will disappear** after closing. However, it can stain cloth.

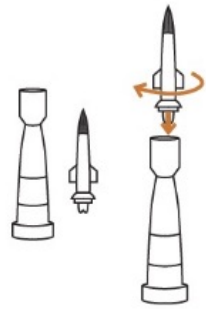
Myth: *Shellfish allergy = iodine allergy.*
No! There is **no cross-reactivity** between shellfish and iodine.

Myth: *Bad taste.*
No! A little bit of iodine **does not taste bad.**



Povidone Iodine (PI):

Povi•One™
10% Povidone-iodine



1. Remove one ampule (caramel-colored container) and one brush (clear adapter) from the box. Screw the brush into the threaded end of the ampule until you hear a “pop” which opens the ampule.



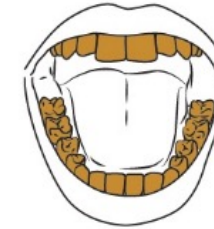
2a. Dry the patient's teeth with gauze or a tissue.

2b. Squeeze ampule over gauze or tissue to wet bristles prior to application.



3. Apply a light application of Povi•One™ to the teeth and gums.

3b. Do not over apply. With the bristles wet, there is no need to squeeze extra material out of the ampule during application.



4a. Continue to rewet bristles over gauze or tissue in between each section.

4b. Continue across all teeth. Keep mouth open for ten seconds after application is complete.

INSTRUCTIONS FOR USE:

Follow your dental or medical professional instructions for frequency of application. Do not use more than one ampule each month unless instructed by a dental or medical professional.



When Fluoride alone isn't enough...

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10% Povidone-Iodine
Oral Antiseptic



Povi•One™ 10% Povidone Iodine Oral Antiseptic is Now Available – Exclusively from Elevate Oral Care®

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Dr. Jeremy Horst Keeper**

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Thank you for joining
Iodine Use in Caries Prevention and Management



- If you experience loss of audio or you lose connection, exit the webinar and re-launch the link. We are recording this webinar. Within a week, this webinar will be posted for viewing with a quiz-based CE opportunity at: <https://www.elevateoralcare.com/elevatingcare>
- Within 1-2 hours of completion of today's broadcast, a certificate for the live 1-hour of CE will be emailed to all participants who have provided their full name and valid email address and remain on the webinar for at least 50 minutes.
- Education on the latest prevention strategies is what we do. To schedule a live in-person or web-based continuing education presentation from your Preventive Care Consultant visit: [elevateoralcare.com](https://www.elevateoralcare.com) or call us at 877-866-9113.



<https://www.youtube.com/watch?v=vPrkD1w6388>



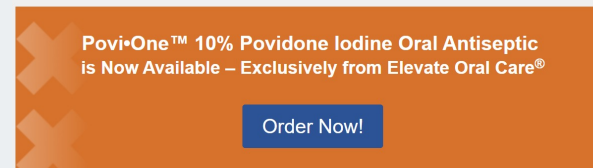
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Povidone Iodine (PI):

Application

The remaining ampules in the kit can be prescribed for the especially motivated patient or parent to use at home. It is designed to be applied quarterly but can be applied every two months if caries risk is high. Ideally, allow the patient/parent to observe the application of povidone iodine while you are doing it. **Some dental providers find it helpful to have the patient or parent do the first application under direct supervision.**

Professional Application in the Office and Dispensing Topical Povidone Iodine for Home Use to Manage Dental Caries in Children and Adults



Jeremy A Horst DDS, PhD
Affiliate Instructor, University of Washington
School of Dentistry Department of Oral Health Sciences
Pediatric Dentist, private practice
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Jeremy Horst is a practicing pediatric dentist and biochemist affiliated with University of Washington and UC San Francisco known for investigating the strengths and limitations of silver fluoride therapy and helping to develop SMART fillings. His mission is to reduce suffering from tooth decay by driving the development of better treatments and preventives. In his teaching and clinical practice he focuses on minimally invasive maximally effective techniques to stop dental caries and create an easy relationship to dentistry for children and people with special healthcare needs or uncontrolled caries.

Peter Milgrom DDS
Professor Emeritus, University of Washington School of Dentistry Department of Oral Health Sciences
dfrc@uw.edu

Peter Milgrom is an internationally recognized dentist clinician and researcher with academic appointments at the University of Washington, University of Michigan, Case Western University, and the University of Rochester and a professional career spanning nearly 50 years. He is the author of more than 325 research articles and multiple books. Among his achievements have been the introduction of silver diamine fluoride into the United States and the development of a fluoride varnish with iodine that is currently under consideration by the US Food and Drug Administration. His work has been recognized by many international awards.



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Povidone Iodine (PI):

Povi-One[®] 10% Povidone-iodine Antiseptic



- Oral Antimicrobial
- Oral Antiseptic
- Kills Germs
- Patient Friendly Flow-Thru™ Ampules

Drug Facts

Active ingredient (in each ampule) Povidone-iodine USP, 10% w/v.....
Purpose Antiseptic

Uses health-care antiseptic for preparation of the skin and oral tissues, first aid antiseptic to help prevent the risk of infection, clears bacteria that can cause infection ■ cuts ■ scrapes ■ burns

Warnings For external use only

Do not use ■ in the eyes ■ over large areas of the body ■ if you are allergic to povidone-iodine or any other ingredients in this preparation ■ more than one unit per patient per month unless directed otherwise by a doctor

Stop use and ask a doctor if irritation or redness occurs.

Keep out of reach of children. Do not swallow, expectorate (spit) extra material out. If more than one dose is swallowed, seek medical advice or contact a Poison Control Center right away.

Directions

- Remove one ampule (caramel-colored container) and one brush (clear adapter) from the box.
- Screw the brush into the threaded end of the ampule until you hear a "pop" which opens the ampule.
- Dry the patient's teeth with gauze or a tissue.
- Apply a light application of Povi-One to the teeth and gums surrounding the teeth.
 - Do not over-apply. Often, wetting the bristles before applying to teeth is sufficient to deliver the product.
 - You will likely have extra material in the ampule when finished. There is no need to use the extra material.
- Discard the ampule. Do not re-use the product.
- Follow your dental or medical professional instructions for frequency of application. **Do not use more than one ampule each month unless instructed by a dental or medical professional.**

Drug Facts (continued)

Other information

- Store at 25°C (77°F); excursions permitted between 15°-30°C (59°-86°F)

Inactive ingredients

Citric Acid, Disodium Phosphate, Glycerin, Purified Water, Sodium Citrate, Tween 80

Contents 6 unit-dose applicators, each containing 0.45 mL

Questions? 877-866-9113 (8:30am-5pm, EST, Mon-Fri) or visit www.elevateoralcare.com.



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D1355 – ADA Guide to Reporting Caries Preventive Medicament Application

This guide is to educate dentists and others in the dental community on the procedure and its code, first published in *CDT 2021*.

CDT Code D1355

Introduction

CDT code D1355, effective on January 1, 2021, enables documenting and reporting this preventive “per tooth” procedure. The full CDT Code entry published in *CDT 2021* follows.

D1355 caries preventive medicament application – per tooth

For primary prevention or remineralization. Medicaments applied do not include topical fluorides.

The Code Maintenance Committee (CMC) agreed with the action request submitter’s rationale that a new code was needed to fill a procedure reporting gap:

“There is a gap in the current code. **D1354** covers the application of medicaments for secondary (2^o) prevention; that is, **interim arrest of caries**. **But these same materials, particularly silver diamine fluoride, silver nitrate, and chlorhexidine, are used to prevent caries lesions on high-risk tooth surfaces, such as exposed root surfaces in older adults, deep fissures in permanent or primary teeth or around molar bands in fixed orthodontic treatment.**”

Application of a caries preventive medicament (D1355) is one of several preventive services delivered to a patient based on the dentist’s diagnosis of the patient’s clinical condition. **The D1355 procedure is a per-tooth preventive procedure where there is no carious lesion present.** **Delivery of D1355 may be prompted by findings of a caries risk assessment procedure** (i.e., “D0602 caries risk assessment and documentation, with a finding of moderate risk” or “D0603 caries risk assessment an documentation, with a finding of high risk”). As the medicament application is per-tooth this procedure is not similar to either of the topical fluoride applications (D1206 and D1208) as both are full-mouth procedures.



D1355 – ADA Guide to Reporting Caries Preventive Medicament Application

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CDT Code D1355

Questions and Answers

1. Why is the caries preventive medicament procedure (D1355) delivered and reported “per tooth” while the topical fluoride treatment procedures (D1206 and D1208) involve all teeth present in the oral and are reported as “full mouth”?

The D1355 procedure is delivered selectively when the patient’s tooth has one or more specific surfaces that are diagnosed as at high risk (e.g., after delivery of procedure “D0603 caries risk assessment an documentation, with a finding of high risk”) for development of a carious lesion.

2. Is there a specific medicament applicable to this procedure?

No – D1355's CDT Code entry describes a discrete procedure for application of a "caries preventive medicament" excluding only topical fluorides. Examples of topical fluorides are foams, gels, rinses and varnish. Medicaments that would be applied during the delivery of the D1355 procedure include Silver Diamine Fluoride (SDF), Silver Nitrate (SN), thymol-CHX varnish, and topical povidone iodine (PVP-I). The dentist providing this service would determine the appropriate medicament to be applied.

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https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/publications/cdt/d1355_adaguidetoreportingcariespreventivemedicamentapplication_2021aug.pdf?rev=325c43aa41164c5ea0d62b569a837d5a&hash=687ED0299EF3DFFDA9FD087E225914B7

Group Discussion and Q & A



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Questions?



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Dr. Sean Kelly: drkelly55@gmail.com

Dr. Miranda Davis: mdavis@npaihb.org

Thank You!



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Evaluation and CDE Information



To obtain CDE, visit: <https://www.ihs.gov/doh/>, after logging in, click on the "Catalog" icon, find the corresponding course number (Live Webinar Course # **DE0755** Recorded Course # **DE0758**), and enter the completion code: **Watertown**



Thank You for Attending!



To view today's recording, slides, and other resources:

<https://www.indiancountryecho.org/resources/silver-diamine-fluoride-and-povidone-iodine-may-10-2023/>



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