

SILVER DIAMINE FLUORIDE WEBINAR

Goal

To introduce Silver Diamine Fluoride as fundamental and permanent change in thinking and dental practice patterns, based on the latest research, and breakthrough therapy.

Healthcare Milestones

- Medical Milestones
 - Medications
 - Digitalis
 - Aspirin
 - Antibiotics
 - Statins
- Dental Milestones
 - Anesthesia (1846 Dr Wells)
 - Fluoride Impact (Dr McKay and G V Black in Colorado)
 - The hand piece aka air rotor drill (now electric)
 - Bonding (Buonocore)
 - Lidocaine

Latest Milestone

- Silver Diamine Fluoride
 - ADA Code D1354



Clinical Indications

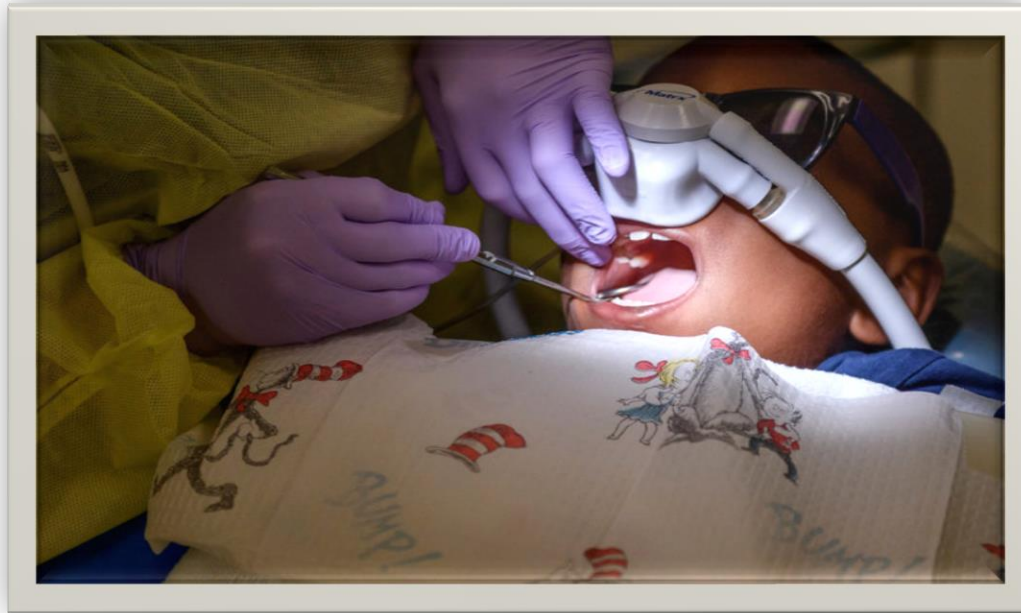


Scientific Literature

New York Times: August 24th 2017

Should Kids Be Sedated for Dental Work?

By CATHERINE SAINT LOUIS



Scientific Literature article cont.

- In dental offices nationwide, children who need cavities filled or teeth pulled are sometimes sedated. Ideally, it makes them less anxious and more cooperative.
- They may swallow a liquid sedative or inhale laughing gas and once it kicks in, they will be conscious but calmer, so the dentist can do extensive work.
- But in rare cases, children fall into a much deeper level of sedation than intended. If they aren't rescued quickly, they may stop breathing or even die. It is critical for the dental staff to keep track of the patient's vital signs and quickly recognize an obstructed airway or a problem with the heart or breathing.
- In recent years, a few reports of sedated children dying at dental offices have come to light, alarming lawmakers, parents and the dental profession. In 2013, [University of Washington researchers](#) found 44 cases over three decades in which dental patients died after sedation or general anesthesia. Most were 2 to 5 years old.
- More recently, in 2016, [Daisy Lynn Torres](#), 14 months old, underwent general anesthesia at an Austin dental office to fix two cavities, and died after her heart and breathing stopped. Her parents sued after dental experts found no evidence of cavities on her X-rays.
- In June, 2016 [Daleyza Hernandez-Avila](#) 3, went to a surgical center in Stockton, Calif., to have her teeth fixed and never woke up.

SDF Effectiveness

- Untreated dental caries are a significant pediatric public health problem. One in every seven U.S. children ages 2 to 8 years has untreated dental caries in primary teeth, according to National Health and Nutrition Examination Survey data.

(Dye BA, et al. NCHS data brief, no 191. Hyattsville, Md.;
National Center for Health Statistics, 2015)

- SDF has been used internationally for decades to arrest dental caries in primary and permanent teeth. As reported in a recently published meta-analysis, two-thirds of all dentinal caries lesions studied (those that had progressed into the dentin).
- **“Were found to be arrested after treatment with SDF”**

(Gao SS, et al. BMC Oral Health. 2016;16:12).
Elise Sarvas, D.D.S., M.S.D., M.P.H: Jeffrey M. Karp, D.M.D.

Aug 5, 2016

What Can We Do?

Implement use of

Silver Diamine Fluoride

for every patient where clinically appropriate!



A Cavity-Fighting Liquid Lets Kids Avoid Dentists' Drills

By [CATHERINE SAINT LOUIS](#) JULY 11, 2016

Dr. Jeanette MacLean, left, and a dental assistant, Stacy Serna, with 4-year-old Knox Urschel, before treating a cavity with silver diamine fluoride in Glendale, Ariz. Credit Caitlin O'Hara for The New York Times

Nobody looks forward to having a cavity drilled and filled by a dentist. Now there's an alternative: an antimicrobial liquid that can be brushed on [cavities](#) to stop tooth decay — painlessly.

The liquid is called silver diamine fluoride, or S.D.F. It's been used for decades in Japan, but it's been available in the United States, under the brand name Advantage Arrest, for just about a year.

The Food and Drug Administration cleared [silver diamine fluoride](#) for use as a tooth desensitizer for adults 21 and older. But studies show it can halt the [progression of cavities](#) and [prevent them](#), and dentists are increasingly using it off-label for those purposes.

Photo

FDA Approval



The Food and Drug Administration cleared silver diamine fluoride for use as a tooth desensitizer for adults 21 and older. But studies show it can halt the progression of cavities and prevent them, and dentists are increasingly using it off-label for those purposes.

Peer Review Literature

Silver diamine fluoride (SDF) may be better than fluoride varnish and clearly better than no treatment in arresting and preventing cavitated carious lesions.

Beltrán-Aguilar ED¹

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ARTICLE TITLE AND BIBLIOGRAPHIC INFORMATION:

Silver diamine fluoride: A caries "silver-fluoride bullet." Rosenblatt A, Stamford TCM, Niederman R. J Dent Res 2009;88(2):116-25.

REVIEWER:

Eugenio D. Beltrán-Aguilar, DMD, MPH, MS, DrPH, Diplomate ABDPH
PURPOSE/QUESTION: The authors conducted a systematic review of clinical studies on the effectiveness of silver diamine fluoride to arrest and prevent dental caries at the cavitated level.

SOURCE OF FUNDING:

NIH Grant (DOI:10.1177/0022034508329406)

TYPE OF STUDY/DESIGN:

Systematic review

LEVEL OF EVIDENCE:

Level 2: Limited-quality patient-oriented evidence
STRENGTH OF THE RECOMMENDATION GRADE: Grade B:
Limited-quality patient-oriented evidence.

Peer Review Literature

ARTICLE:

UCSF protocol for caries arrest using silver diamine fluoride: rationale, indications and, presenting "a systematic review, clinical indications, clinical protocol and consent procedure to guide application for caries arrest treatment."



University of California
San Francisco

"For any patient with active caries, we recommend considering replacement of fluoride varnish as the primary means to prevent new lesions, with application of silver diamine fluoride to the active lesions only."

https://www.cda.org/Portals/0/journal/journal_012016.pdf

Organized Dentistry



- *Since its approval in Japan more than 80 years ago, more than 2 million containers have been sold. The silver acts as an antimicrobial, the fluoride promotes remineralization and the ammonia outperforms other anti-caries medicaments in killing cariogenic bacteria in dentinal tubules in.*

~January 2016/CDA JOURNAL, VOL 44, No 1 pg's 17-28

Clinical Evidence

- In the nine randomized clinical trials in which silver diamine fluoride was applied to multiple teeth to arrest or prevent dental caries.
- The only side effect noted was for three of 1,493 children or elderly patients monitored for one to three years who experienced “a small, mildly painful white lesion in the mucosa, which disappeared at 48 [hours] without treatment.”

Application

- In Texas, the Dental Practice Act allows hygienists under supervision to place SDF.
- Application twice per year outperforms **all** minimally invasive options including the atraumatic restorative technique — with which it is compatible but 20 times less expensive.
- It approaches the success of dental fillings after two or more years, and again, prevents future caries while fillings do not.
- Silver diamine fluoride is more effective as a primary preventive than any other available material, with the exception of dental sealants, which are > 10 times more expensive and need to be monitored.

Caries Arrest

Decisions **CE** EARN 2
IN DENTISTRY **UNITS**
This self-study CE course is written for dentists,
dental hygienists and dental assistants.

Caries Arrest With Silver DIAMINE FLUORIDE

THE USE OF THIS AGENT OFFERS MANY BENEFITS
IN MANAGING LESIONS, ESPECIALLY AMONG
UNDERSERVED AND LOW-INCOME POPULATIONS

By Bernadette Alvear Fa, DDS; Jeremy A. Horst,
DDS, MS, PhD; Jason P. Hirsch, DMD, MPH;
Steve Duffin, DDS; Allen Wong, DDS, EdD; and
Douglas A. Young, DDS, EdD, MBA, MS

EDUCATIONAL OBJECTIVES

After reading this course, the participant should be able to:

1. Describe silver diamine fluoride's (SDF) mechanism of action.
2. Identify possible uses for SDF in clinical practice.
3. List the contraindications for SDF.
4. Discuss the technique for using SDF.

In light of the fact that dental caries remains a significant problem across all age groups,¹ researchers have long sought additional approaches to caries management.² Among these, caries management by risk assessment (CAMBRA)³ is based on the unique risks faced by each patient.³ The CAMBRA protocol is an evidence-based approach to preventive and reparative treatment of early caries lesions that can be integrated into any dental setting. Sample CAMBRA protocols have been published and updated for children⁴ and adults.^{5,6} These guidelines focus on modifying individuals' risk factors via a combination of chemotherapeutic interventions, coupled with behavioral modifications targeted at altering microbiota while supporting tooth remineralization.



Although silver diamine fluoride (SDF) has long been used in Japan, Australia and Argentina for caries prevention, and the value of silver ions to treat dental caries has been known for more than a century, SDF only recently became available in the United States. In 2014, the U.S. Food and Drug Administration cleared SDF for marketing as a Class II medical device for treating dentinal hypersensitivity in adults. Consequently, choosing this chemotherapeutic option for caries management in the U.S. is considered off-label use, similar to fluoride varnish. As with other forms of off-label use, clinicians should use professional judgment when applying SDF for caries management.⁷

A 2009 systematic review reported that SDF is a safe and effective caries-preventive agent that appears to meet both the World Health Organization's Millennium Goals and the U.S. Institute of Medicine's criteria.⁸ The use of SDF to chemically arrest active caries eliminates the need for local anesthesia and electric or air-turbine handpieces, which can improve children's experience in the dental office. This paper will review the scientific properties of SDF and its clinical applications for caries arrest.

PHOTO: GETTY IMAGES

SDF “The Future”

- Experience suggests that dryness prior to application enhances effectiveness.
- Good patient management is still profoundly relevant to the very young and otherwise challenged patients, though this one-minute intervention is more tolerable than other options.
- ***We are aware of many cases where an apprehensive child would not allow or tolerate invasive treatment early in their dental experience; but these children DO allow application of SDF.***
- Silver diamine fluoride can readily replace fluoride varnish for the prevention of caries in patients who have active caries.
- This is a powerful new tool in the fight against dental caries, particularly suited for those who suffer most from this disease.

Application Protocol

- i. Apply to caries lesions or high risk surfaces (e.g. newly exposed pits & fissures, newly exposed root surfaces).
- ii. Dry the surface as well as possible.
- iii. Consider application of Vaseline to gingiva.
- iv. Apply for 1 minute.
- v. Rinse gently.
- vi. Limit is 1 drop per 10kg bodyweight per visit.

~Dr. Jeremy Horst

Concerns/Setbacks

There is about 95% selection of this option for posterior teeth, and about 50% for anterior teeth”.

~Dr. Jeremy Horst

When To Use

Significant: Caries control / holding care for patients of all ages.

- ✓ Extreme caries risk (xerostomia or severe early childhood caries).
- ✓ Treatment challenged by behavioral or medical management.
- ✓ Patients with carious lesions that may not all be treated in one visit.
- ✓ Difficult to treat dental carious lesions.
- ✓ Patients without access to dental care.

Treatment Process We Use

- *We most often separate treatment days for SDF and any restorative material:*
- *SDF during the diagnostic visit, ART/etc over it on treatment visits.*
- *SDF is also used as an indirect pulp cap / cavity liner, understanding that significant discoloration may occur to plastic filling materials and at the margin of glass filling materials.*

Generally **80-90%** success with multiple applications

Literature Abstract

ABSTRACT:

This review aims to investigate the clinical effectiveness of silver diamine fluoride (SDF) in arresting dental caries among children. A systematic search of publications was conducted with the key words “silver diamine fluoride,” “silver diamine fluoride,” “silver fluoride,” “diamine silver fluoride,” or “diamine silver fluoride” as well as their translation in Chinese, Japanese, Portuguese, and Spanish in 7 databases: PubMed (English), (English), Scopus (English), China National Knowledge Infrastructure (Chinese), Ichushi-web (Japanese), Biblioteca Virtual em Saude (Portuguese), and Biblioteca Virtual en Salud Espana (Spanish). Duplicated publications were deleted. The title and abstract were screened and irrelevant publications were excluded. The full text of the remaining publications was retrieved. Prospective clinical studies of SDF that reported a caries-arresting effect among children were included. Meta-analysis was performed for quantitative analysis. A total of 1,123 publications were found, including 19 publications of clinical trials. Sixteen clinical trials studied the caries-arresting effect on primary teeth, and 3 clinical trials were on permanent teeth. Fourteen studies used 38% SDF, 3 used 30% SDF, and 2 used 10% SDF. Meta-analysis was performed on extracted data from 8 studies using 38% SDF to arrest caries in primary teeth. The overall percentage of active caries that became arrested was 81% (95% confidence interval, 68% to 89%; $P < 0.001$). Apart from staining the arrested lesion black, no significant complication of SDF use among children was reported. SDF was commonly used at 38%. It was effective in arresting dentine caries in primary teeth among children. Knowledge Transfer Statement: This systematic review found that 38% silver diamine fluoride (SDF) can effectively arrest caries among children. SDF treatment is noninvasive and easily operated. It can be a promising strategy to manage dental caries in young children or those who have special needs.

Chemical Composition

Silver diamine fluoride

- *25% silver*
 - *8% ammonia*
 - *5% fluoride*
- (by weight per volume)*



Arresting Caries

- How long do you find that it takes to thoroughly “arrest” the caries?

We do not have an exact answer for this yet, but it seems the initial response occurs after 1-2 weeks. This must be maintained over time. Repeat application is essential. Just as with oral antibiotics, longer continuation of dosage, and increased frequency deliver better results. ~Dr. Jeremy Horst

Treating Lesions

- *If treating a cavitated lesion: somewhere in the 3-6 month range, with a short leash on the dentists. Just as with antibiotics, there is a (more rare) paradoxical acceleration that has been observed, which I have personally seen.*
- *If treating enamel lesions / noncavitated dentin lesions (radiographic inner third): somewhere in the 12-24 month range.*

~Dr. Jeremy Horst

Benefit Guidelines

- ✓ NOT history violated against other Fluoride treatments
- ✓ NOT history violated against sealants
- ✓ Allow 2 applications within 1 month period; and lifetime limitation of four application
- ✓ Defer restorative Tx till material and “reaction” has approached completion which means
 - ✓ *Minimum* four weeks interval between first application and restorative Tx
 - ✓ Allow as a per treatment benefit like fluoride varnish; (likely to change in 2018)

Questions



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