

SDF for the Dental Practice

Since the 1920s, the primary method of treating dental caries has been the surgical removal (drilling/scooping) of the carious lesion. Prior to the 1920s, caries removal/treatment was done using chemotherapeutic agents to cauterize and disinfect the carious portion of the tooth. This non-surgical approach has been re-introduced using improved agents and techniques. Using these agents and techniques, in combination with other traditional dental cements and filling materials, we have enhanced their efficacy.

I am a retired general dentist who maintained a successful practice for 40 years. During the last three years of my practice, I researched and developed clinical procedures for this non-surgical treatment of dental caries using Silver Diamine Fluoride (SDF) in combination with existing glass ionomer cements and compounds. This combination-technique is called a Silver Modified Atraumatic Restorative Technique. (SMART).

These methodologies are the same as those employed by the leaders and experts in the dental community. I personally found this approach to be extremely successful. I used this technique on most of my young patient-population including our Medicaid children. As we gained experience and realized SDF's potential, we began treating selected elderly patients and our physically or mentally handicapped patients.

Since retiring, I have felt the need to share this knowledge and experience with other dental professionals. My experience told me that the use of SDF and SMART should be part of all dental practices. These basic clinical protocols can be used in many creative ways to simplify treatment and improve your patients' oral health.

I have created a teaching program divided into two parts: a comprehensive, didactic section and a "hands-on" clinical training program. Ideally, I choose to present both parts if time allows. The clinical protocols are not complex, but there are some practical points and examples of commentary to make the process easier and less awkward. Communication must be precise and easily understood.

I hope this program will spark your interest and that you will consider incorporating SDF protocols into your practice. The importance of this program is two-fold: to help treat dental decay more effectively and to use it to creatively market a more comprehensive and modern approach to practicing dentistry.

John S. Echternach, D.D.S.

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Brief Bio

John S. Echternach, D.D.S., is a retired general dentist who maintained a private practice in Henniker, NH, for 40 years. He has been an active member of the American Dental Association, the New Hampshire Dental Society (NHDS) and Concord Dental Society (CDS). His role in organized dentistry includes more than 16 years in a leadership capacity in both the NHDS and the CDS.

In his retirement, John has assumed the role as a teacher of healthcare professionals with his focus on a specific treatment: the science and clinical applications of silver diamine fluoride (SDF). After learning about the uses of SDF toward the end of his career, he successfully used this method on both children and adults for the last three years in his Henniker practice.

In his spare time, Dr. Echternach enjoys bike riding and power walking with his wife, Judie. He also practices tai chi and tinkers with old clocks in his cozy clock shop.

Course Objective

- 1) Give a brief history of silver nitrate and SDF.
- 2) Detail the science, both chemistry and microbiology, of the interaction between SDF and tooth structure.
- 3) Emphasize the importance of complete and thorough understanding of SDF by all staff members in order to implement a successful SDF program.
- 4) Detail specific SDF and SDF-related protocols, including, but not limited to, combining fluoride varnish and glass ionomer materials.
- 5) Review *Informed Consent Form* and how it dovetails with SDF education.
- 6) Review all related CDT codes for SDF use and success.

SDF Fact Sheet

1. SDF: Silver Diamine Fluoride. One Silver (Ag) ion, 2 Amine Radicals, and one Fluoride ion.
2. Tooth decay is a bacterial (BioFilm) infection.
3. Tooth decay is **contagious**.
4. Twenty percent (20%) of the population has 80% of the decay.
5. Bacteria and carbohydrates create acid and collagenase, protease, and other “-ases.”
6. Enamel is 95% **hydroxyapatite (calcium hydroxy phosphate)** and 5% miscellaneous minerals.
7. Dentin is 70% hydroxyapatite (calcium hydroxy phosphate) and 30% collagen.
8. Hydroxyapatite is calcium hydroxy phosphate. $\text{Ca}_5(\text{PO}_4)_3\text{OH}$
9. **BioFilm** is a **matrix** of bacteria, food debris, mineral salts, etc.
10. Don't spend too much time on wasteful thinking.

11. Boring Chemistry

- | | |
|--|---|
| a. SDF: Silver diamine Fluoride $\text{Ag}(\text{NH}_3)_2\text{F}$ | Silver phosphate $\text{Ag}_3(\text{PO}_4)$ |
| b. Hydroxyapatite $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ | Calcium Fluoride CaF_2 |
| c. Fluorapatite $\text{Ca}_5(\text{PO}_4)_3\text{F}$ | Silver nitrate $\text{Ag}(\text{NO}_3)$ |
| d. Sodium Fluoride NaF | Silver Chloride AgCl |

12. Caries (decay): Acid and enzymes from the bacteria/carbohydrate metabolism causes breakdown of both the hydroxyapatite and collagen. Acid breaks down **hydroxyapatite in both the enamel and dentin, and the enzymes (collagenase, etc.) break down the collagen in the dentin.**

13. Silver (Ag ion) does three things:

- a. Breaks through the cell wall of bacteria
- b. Disrupts respiration of the cell by destroying the mitochondria (stops the KREBS Cycle)
- c. Disrupts DNA inside cell to prevent cell duplication

14. SDF: “How to” Application:

Isolate, dry, apply Polyacrylic Acid (PAA), wash/dry, apply SDF. Keep isolated for minimum of 1 (one) minute. DO NOT RINSE OFF SDF.

- a. EITHER cover wet SDF with fluoride varnish OR
- b. Apply glass ionomer (G.I.) material onto wet SDF. Keep isolated and dry until G.I. sets.

15. **No toxicity.** SDF can cause temporary staining on gum tissue. It does not stain healthy tooth structure. It will permanently stain clothes and counter tops.
16. **Zombie Effect:** Silver ions and fluoride ions remain in “dead” dentin and are released slowly over time to continue preventive roles.
17. Best resource for SDF and related topics” www.mmclibrary.com
18. Remember: Your greatest asset is from the neck up, not from the wrist down.

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Spring 2018, “SDF RDH”
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Silver Diamine Fluoride (SDF): MEDICAL MANAGEMENT OF DENTAL DECAY

- Dental decay (caries) is the most common, widespread disease known to man.
- “Cavities” are only symptoms of the disease.
- This disease is communicable.
- The primary infectious agents are bacteria.
- Today the conventional treatment for decay is surgical. “Drilling” out the decayed portion.
- This surgical approach does not inhibit the causative factors of the disease.
- Consistent daily homecare (brushing and flossing) is not a guarantee to prevent decay.
- Demographically, 80% of the decay is found in 20% of the population.

WHAT IS SILVER DIAMINE FLOURIDE?

- “SDF” is a chemotherapeutic agent that kills the bacteria causing decay and remineralizes tooth structure. It combines silver nitrate with fluoride.
- SDF also has a significant residual effect and can continue to inhibit reoccurring decay.
- It is a cost effective method to stop decay in individual teeth.
- The clinical protocol can be performed by trained dental auxiliaries.
- Personal note: I learned this technique from a pediatric dentist who performed treatment in the jungles of Guatemala without modern dental equipment.
- More enhanced techniques can be done utilizing SDF, in combination with other dental restorative materials, to potentiate its effectiveness.
- Historically silver nitrate was used to treat decay almost exclusively prior to the 1920’s because the drill had not yet been invented.
- SDF has been used in more than 6 other developed countries for more than 50 years.
- Very important to understand it DOES NOT structurally restore the tooth shape.
- Also the decayed area stains black and does not diminish. This is good because the black portion continues to prevent recurrent decay.
- SDF is non-toxic, the only contraindication is a silver allergy.
- **“New opinions are always suspect and usually opposed without any other reason but because they are not common” – John Locke**

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WHAT SDF DOES TO TOOTH

Take away from all that chemistry.

It's the right side of the chemical equation that counts



These two compounds do the magic.

- $\text{Ag}_3 (\text{PO}_4)$: kills the bacteria and deposits

phosphate and silver into damaged dentin.

- CaF_2 : deposits calcium and fluoride into damaged dentin.

FRONT DESK SCRIPTING

Patient asks about getting a cavity/broken tooth fixed. REMEMBER the solution for this chief complaint may utilize an SDF protocol.

FD: "You should know that now we can use a liquid antibiotic to repair the tooth. We use it sometimes when doing a conventional filling and sometimes in a less invasive way and can simplify the whole procedure. Remember, a cavity is a bacterial infection ."

BULLET POINTS/PHRASES

"No, it doesn't hurt."

"Sometimes you do not have to use the drill."

"We use it successfully on patients of all ages."

"The liquid SDF has silver in it."

"It's very simple to apply and very safe for all ages."

"It's been used in 6 other modern countries for over 40 years."

"There will be a small gray smudge on your gum for about 10 days."

"The black on the tooth is good! That is the embedded silver that keeps on killing the germs for months."

" Yes, I remember all those cavities you have. Why don't you come in and we can see where SDF can be used on these cavities."

BE CREATIVE! WORK OUT SOME SIMPLE ONE LINERS TO USE IN OTHER AREAS OF THE OFFICE.

- The RDH discussing decay on the patient/explanation to a patient
- Discussing timing on treating numerous decayed teeth. PREVENT FUTURE ENDO.
- Part of comprehensive treatment planning- "PRIMARY SDF TREATMENT PLAN."

BE CREATIVE!

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

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

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

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

SDF can be very useful for some people.

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

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

Medicaid covers SDF.

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

Not everyone can get SDF.

SDF cannot be used if:

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

More Information

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

These teeth have been treated with SDF.



FIVE COMMON MYTHS ABOUT SDF

1. It's going to ruin your practice financially.
2. Patients reject it due to poor aesthetics.
3. It's only for children
4. Patients will not complete treatment.
5. You cannot bond to it.

PLEASE KNOW IT CAN BE HELPFUL, EFFECTIVE, AND PROFITABLE

USEFUL WEBSITES

➤ www.silverdf.org excellent videos for general public and dental professionals.

- Includes today's power point slides
- Also power point for general public
- "How to" videos on 3 major SDF clinical protocols

➤ www.mmclibrary.com

All things SDF and a vast resource for cariology and history on preventive techniques. Also features other power point programs from prominent speakers.

➤ www.kidsteethandbraces.com

This is Dr. Jeanette MacLean's website. A great resource for the private practice. Patient handouts, etc.,.

To Whom It May Concern:

_____ has successfully completed the

following continuing education course:

Course Title: SDF/SMART FOR THE DENTAL TEAM.

Date: _____

Dental CEU Credits: 2

Instructor: Dr. John S. Echternach, DDS

VERIFICATION NUMBER: _____

(PLEASE RETAIN FOR YOUR RECORDS.)

Course Evaluation

Please rate 1-5, 5 being the best.

- 1) I gained knowledge by attending this training. _____
- 2) I will apply what I have learned here in our office. _____
- 3) Course material was understandable. _____
- 4) Course material was complete. _____
- 5) I could use this information tomorrow. _____
- 6) My expectations of the training were met. _____

Your comments below, please.

Thank you,

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