

## A Nonsurgical Caries Treatment Option: Silver Diamine Fluoride (SDF)



**Course Author(s):** Jeanette MacLean, DDS, Diplomate, American Board of Pediatric Dentistry, FAAPD, FPFA, FACD

**CE Credits:** 1.5 hours

**Intended Audience:** Dentists, Dental Hygienists, Dental Assistants, Dental Students, Dental Hygiene Students, Dental Assisting Students, Office Managers

**Date Course Online:** 11/15/2023

**Last Revision Date:** N/A

**Course Expiration Date:** 11/14/2026

**Cost:** Free

**Method:** Self-instructional

**AGD Subject Code(s):** 430

**Online Course:** [www.dentalcare.com/en-us/ce-courses/ce678](http://www.dentalcare.com/en-us/ce-courses/ce678)

#### Disclaimers:

- P&G is providing these resource materials to dental professionals. We do not own this content nor are we responsible for any material herein.
- Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

#### Conflict of Interest Disclosure Statement

- Dr. Jeanette MacLean nor members of her immediate family have any financial interests to disclose relating to the content of this presentation. She has no conflicts of interest associated with this course.

#### Short Description

This course will discuss the science and clinical use of silver diamine fluoride (SDF) for dental desensitization and caries arrest. A brief review of the literature and basic clinical application protocol will be reviewed.

## Course Contents

- Overview
- Learning Objectives
- Video: Silver Diamine Fluoride (SDF)
- Course Test
- References / Additional Resources
- About the Author

## Overview

This course will discuss the science and clinical use of silver diamine fluoride (SDF) for dental desensitization and caries arrest. A brief review of the literature and basic clinical application protocol will be reviewed.

Silver diamine fluoride (SDF) is a revolutionary approach to combating caries in a non-invasive manner. Following a widely publicized 2016 feature in the New York Times, there has been tremendous interest surrounding the use of SDF from patients and dentists. In October 2018, the ADA released its first ever evidence-based clinical practice guideline for nonrestorative treatments for carious lesions, including SDF. SDF represents a nonsurgical treatment option, which can be done without the use of local anesthetic or hand pieces. Learn the principles of case selection, informed consent, treatment planning, and a clinical protocol for SDF. Find out how offering minimally invasive options like SDF can attract new patients, improve patient satisfaction, and increase internal marketing and word of mouth referrals to your practice.

## Learning Objectives

**Upon completion of this course, the dental professional should be able to:**

- Describe the evidence for using SDF to treat and prevent dental caries.
- Review informed consent, coding, and billing of SDF.
- Describe case selection, materials, and a clinical protocol for SDF.

## Video: Silver Diamine Fluoride (SDF)



[Click on image to view video online.](#)

## Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: [www.dentalcare.com/en-us/ce-courses/ce678/test](http://www.dentalcare.com/en-us/ce-courses/ce678/test)

- 1. According to the literature, SDF arrests approximately what percentage of carious lesions?**
  - A. 100%
  - B. 80%
  - C. 50%
  - D. 25%
  
- 2. Which of the following is a contraindication for SDF treatment?**
  - A. Irreversible pulpitis
  - B. Cavitated lesions
  - C. Incipient lesions
  - D. Root caries
  
- 3. What is the pH of Advantage Arrest 38% SDF?**
  - A. 13
  - B. 7
  - C. 10
  - D. 5
  
- 4. Ideally, SDF should be applied to a lesion for at least \_\_\_\_\_.**
  - A. 10 seconds
  - B. 10 minutes
  - C. 1 minute
  - D. 5 minutes
  
- 5. Which best describes the step immediately following application of SDF:**
  - A. Light cure
  - B. Allow it to air dry
  - C. Rinse
  - D. Dry with compressed air
  
- 6. When working with SDF, a good rule of thumb is: one drop per \_\_\_\_ body weight.**
  - A. 10 kg
  - B. 100kg
  - C. 5kg
  - D. 1kg
  
- 7. What is the CDT code for Interim Caries Arresting Medicament, otherwise known as the SDF code?**
  - A. 1204
  - B. 1205
  - C. 1354
  - D. 1355
  
- 8. SDF is radiolucent.**
  - A. True
  - B. False

**9. What is the minimum frequency that SDF should be reapplied to unrestored carious lesions?**

- A. It only needs to be applied once
- B. Annually
- C. Biannually
- D. Monthly

**10. Which of the following is a disadvantage of applying potassium iodine (KI) after SDF?**

- A. Using a rubber dam can help prevent soft tissue from the higher pH.
- B. It reduces the efficacy of SDF and still produces perceptible stain over time.
- C. KI can reduce initial darkening of SDF treated lesions.
- D. It will not stain healthy enamel.

## References

1. Dye BA, Thornton-Evans G. Trends in oral health by poverty status as measured by Healthy People 2010 objectives. *Public Health Rep.* 2010;125(6):817-830. doi:10.1177/003335491012500609.
2. Centers for Medicare and Medicaid Services, 2011b. National Health Expenditure Projections 2011–2021. U.S. Department of Health and Human Services, Washington, DC.
3. Twetman S, Dhar V. Evidence of Effectiveness of Current Therapies to Prevent and Treat Early Childhood Caries. *Pediatr Dent.* 2015;37(3):246-253.
4. Fontana M, Pilcher L, Tampi MP, et al. Caries management for the modern age: Improving practice one guideline at a time. *J Am Dent Assoc.* 2018;149(11):935-937. doi:10.1016/j.adaj.2018.09.004.
5. Nelson T, Scott JM, Crystal YO, Berg JH, Milgrom P. Silver Diamine Fluoride in Pediatric Dentistry Training Programs: Survey of Graduate Program Directors. *Pediatr Dent.* 2016;38(3):212-217.
6. Ngoc CN, Mehta R, Donovan TE, Ferreira Zandona AG. Teaching Silver Diamine Fluoride in U.S. Dental Schools' Predoctoral Curricula. *J Dent Educ.* 2018;82(12):1305-1309. doi:10.21815/JDE.018.141.
7. AAPD Council on Clinical Affairs. Policy on the Use of Silver Diamine Fluoride for Pediatric Dental Patients, Reference Manual 2018-2019, *Pediatr Dent.* 40(6):51-4. Accessed October 1st, 2023.
8. Crystal YO, Niederman R. Silver Diamine Fluoride Treatment Considerations in Children's Caries Management. *Pediatr Dent.* 2016;38(7):466-471.
9. Vasquez E, Zegarra G, Chirinos E, et al. Short term serum pharmacokinetics of diammine silver fluoride after oral application. *BMC Oral Health.* 2012;12:60. Published 2012 Dec 31. doi:10.1186/1472-6831-12-60.
10. Chibinski AC, Wambier LM, Feltrin J, Loguercio AD, Wambier DS, Reis A. Silver Diamine Fluoride Has Efficacy in Controlling Caries Progression in Primary Teeth: A Systematic Review and Meta-Analysis. *Caries Res.* 2017;51(5):527-541. doi:10.1159/000478668.
11. Oliveira BH, Cunha-Cruz J, Rajendra A, Niederman R. Controlling caries in exposed root surfaces with silver diamine fluoride: A systematic review with meta-analysis. *J Am Dent Assoc.* 2018;149(8):671-679.e1. doi:10.1016/j.adaj.2018.03.028.
12. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. *J Am Dent Assoc.* 2018;149(10):837-849.e19. doi:10.1016/j.adaj.2018.07.002.
13. Crystal YO, et al. Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs. Reference Manual 2018-2019, *Pediatr Dent.* 40(6):152-61.
14. Chu CH, Lo EC, Lin HC. Effectiveness of silver diamine fluoride and sodium fluoride varnish in arresting dentin caries in Chinese pre-school children. *J Dent Res.* 2002;81(11):767-770. doi:10.1177/0810767.
15. Crystal YO, Janal MN, Hamilton DS, Niederman R. Parental perceptions and acceptance of silver diamine fluoride staining. *J Am Dent Assoc.* 2017;148(7):510-518.e4. doi:10.1016/j.adaj.2017.03.013.
16. Zhao IS, Mei ML, Burrow MF, Lo EC, Chu CH. Effect of Silver Diamine Fluoride and Potassium Iodide Treatment on Secondary Caries Prevention and Tooth Discolouration in Cervical Glass Ionomer Cement Restoration. *Int J Mol Sci.* 2017;18(2):340. Published 2017 Feb 6. doi:10.3390/ijms18020340.
17. 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;51:15-20. doi:10.1016/j.jdent.2016.05.005.
18. Craig G, Powell K. A Handbook of Expanded Atraumatic Techniques for the Apprehensive Child Dental Patient. Dental Outlook Publications, 2013. Accessed October 1st, 2023.
19. Englander HR, James VE, Massler M. Histologic effects of silver nitrate of human dentin and pulp. *J Am Dent Assoc.* 1958;57(5):621-630. doi:10.14219/jada.archive.1958.0258.

20. Gotjamanos T. Pulp response in primary teeth with deep residual caries treated with silver fluoride and glass ionomer cement ('atraumatic' technique). *Aust Dent J*. 1996;41(5):328-334. doi:10.1111/j.1834-7819.1996.tb03142.x.
21. Macwan C, Deshpande A. Mineral trioxide aggregate (MTA) in dentistry: A review of literature. *J Oral Res Rev*. [serial online] 2014 [cited 2020 Sep 19];6:71-4. Accessed October 1st, 2023.
22. Quock RL, Barros JA, Yang SW, Patel SA. Effect of silver diamine fluoride on microtensile bond strength to dentin. *Oper Dent*. 2012;37(6):610-616. doi:10.2341/11-344-L.
23. Wu DI, Velamakanni S, Denisson J, Yaman P, Boynton JR, Papagerakis P. Effect of Silver Diamine Fluoride (SDF) Application on Microtensile Bonding Strength of Dentin in Primary Teeth. *Pediatr Dent*. 2016;38(2):148-153.
24. Puwanawiroj A, Trairatvorakul C, Dasanayake AP, Auychai P. Microtensile Bond Strength Between Glass Ionomer Cement and Silver Diamine Fluoride-Treated Carious Primary Dentin. *Pediatr Dent*. 2018;40(4):291-295.
25. Frencken JE. *The Art and Science of Minimal Intervention Dentistry and Atraumatic Restorative Treatment*. Comberton, Orleton, UK. Stephen Hancocks; 2018.
26. Seifo N, Robertson M, MacLean J, Blain K, Grosse S, Milne R, Seeballuck C, Innes N. The use of silver diamine fluoride (SDF) in dental practice. *Br Dent J*. 2020 Jan;228(2):75-81. doi: 10.1038/s41415-020-1203-9. PMID: 31980777.
27. Sihra R, Schroth RJ, Bertone M, Martin H, Patterson B, Mittermuller BA, Lee V, Patterson B, Moffatt ME, Klus B, Fontana M, Robertson L. The Effectiveness of Silver Diamine Fluoride and Fluoride Varnish in Arresting Caries in Young Children and Associated Oral Health-Related Quality of Life. *J Can Dent Assoc*. 2020 Jun;86:k9. PMID: 32543369.
28. Turton B, Horn R, Durward C. Caries arrest and lesion appearance using two different silver fluoride therapies on primary teeth with and without potassium iodide: 12-month results. *Clin Exp Dent Res*. 2021 Aug;7(4):609-619. doi: 10.1002/cre2.367. Epub 2020 Dec 28. PMID: 33370847; PMCID: PMC9632638.

### Additional Resources

- Affiliated Children's Dental Specialists – SDF Chairside Guide
- Affiliated Children's Dental Specialists - Sample Informed Consent Form

### About the Author

#### **Jeanette MacLean, DDS, Diplomate, American Board of Pediatric Dentistry, FAAPD, FPFA, FACD**



Dr. Jeanette MacLean is a Diplomate of the American Board of Pediatric Dentistry, Fellow of the American Academy of Pediatric Dentistry, owner of Affiliated Children's Dental Specialists in Glendale, Arizona, and mother of two. She received her dental degree, with honors, from the University of Southern California in 2003 and completed her specialty training in pediatric dentistry in 2005 at Sunrise Children's Hospital through the University of Nevada School of Medicine. Dr. MacLean has become an internationally recognized advocate and expert on minimally invasive dentistry, appearing in newspapers, magazines, television, and continuing education lectures on this hot topic. Most notably, she was featured

in the July 2016 New York Times article "A Cavity Fighting Liquid Helps Kids Avoid Dentists' Drills," which brought national attention to the option of treating cavities non-invasively with silver diamine fluoride.

Email: [drmaclean@yahoo.com](mailto:drmaclean@yahoo.com)