Chairside Guide: Silver Diammine Fluoride in the Management of Dental Caries Lesions*

Dental caries affects more than 1 of every 5 children ages 2 through 5 years in the US.[1] Silver diammine fluoride (**SDF**) is efficacious in arresting caries lesions[2,3] and may be included as part of a caries management plan for patients. Caries lesions treated by SDF usually turn black and hard. Multiple applications of SDF over time may be necessary to sustain arrest.

Active cavitated caries lesions before application of SDF

SDF-treated lesions with temporary gingival staining

Case selection for application of silver diammine fluoride

Patients with cavitated lesions who may benefit from SDF include those

- with high caries risk.
- with behavioral or medical management challenges.
- who may need multiple restorative treatment visits.
- with teeth that are difficult to restore.
- with difficulty accessing dental care.

Criteria for tooth selection include

- cavitated caries lesions that are not encroaching on the pulp and have no signs/symptoms of pulpal involvement (eg, unprovoked/lingering/spontaneous pain). If possible, radiographs should be taken to assess depth of caries lesions.
- cavitated caries lesions on any surface as long as they are accessible with a brush for applying SDF. (Orthodontic separators may be used to help gain access to proximal lesions.)

SDF can be used prior to restoration placement and as part of caries control therapy.[4] Obtaining informed consent—including outcomes such as permanent staining of treated lesions, potential staining of skin and clothes, and unknown duration of caries arrest (with possible need for reapplication) as well as the role of SDF within a comprehensive preventive plan—is recommended.[5]

Clinical application of silver diammine fluoride

- Age and weight of the child, along with the number of lesions requiring treatment, should be considered when determining how many drops of SDF can be safely applied in one visit. One drop of SDF contains approximately 1.7 mg of fluoride and 8.5 mg of silver.[6]
- Remove gross debris from cavitated lesion to allow better SDF contact with decayed dentin.
- Carious dentin excavation prior to SDF application is not necessary. As caries excavation may reduce the proportion of the tooth surface that turns black, it may be considered for esthetic purposes.
- A protective coating may be applied to the lips and skin to prevent a temporary henna-appearing tattoo that can occur if SDF contacts soft tissues.
- Isolate teeth to be treated using cotton rolls or other isolation methods. If applying protective coating to surrounding gingival tissues, use care to avoid coating the surfaces of the caries lesions.
- Caution should be taken when applying SDF on primary teeth adjacent to permanent anterior teeth that may have noncavitated (ie, white-spot) lesions to avoid inadvertent staining.
- Bend the microbrush. Dip brush into SDF and dab on the side of the plastic dappen dish to remove excess liquid before application. Carefully restrict direct application of SDF to only the affected dentin lesion.
- Application time should be at least 1 minute if possible, making sure the SDF is in contact with all areas of the lesion (especially in large posterior lesions). Shorter application times may result in lower arrest rates.
- Remove excess SDF with gauze, cotton roll, or cotton pellet to minimize ingestion.

* *Refer to the AAPD's clinical practice guideline: Crystal YO, Marghalani AA, Ureles SD, et al. Use of silver diamine fluoride for dental caries management in children and adolescents, including those with special health care needs. Pediatr Dent 2017;39(5): E135-E145. (Available at: http://www.aapd.org/policies/)*

Follow-up and monitoring

Estimations of SDF effectiveness in arresting dental caries lesions range from 47% to 90% with 1-time application,[4,7-9] depending on size of the cavity, tooth location, and presence of plaque. Anterior teeth have higher rates of arrest than posterior teeth.[7] Therefore, follow-up for evaluation of caries arrest is advised.[2,3,10]

- Recommendations for follow-up range from 2 weeks to 4 months after initial treatment to assess the arrest of the treated lesions.[5,9,11-13]
- Reapplication of SDF may be indicated if the treated lesions do not appear arrested (dark and hard), with biannual reapplication showing increased caries arrest rate versus a single application.[7]
- Application of 5% sodium fluoride varnish up to 4 times per year is recommended to prevent new caries lesions and to arrest noncavitated enamel lesions not treated with SDF. During these visits, dietary and oral hygiene counseling should be reinforced.[14]

References

1. Stierman B, Afful J, Carroll MD, et al. National Health and Nutrition Examination Survey 2017–March 2020 prepandemic data files—Development of files and prevalence estimates for selected health outcomes. National Health Statistics Reports; no 158. Hyattsville, MD: National Center for Health Statistics. 2021. Available at: "https://dx.doi.org/10.15620/cdc:106273". Accessed June 29, 2025.
2. Gao SS, Zhang S, Mei ML, Lo EC, Chu CH. Caries remineralisation and arresting effect in children by professionally applied fluoride treatment – A systematic review. BMC Oral Health 2016;16:12.
3. Duangthip D, Jiang M, Chu CH, Lo EC. Restorative approaches to treat dentin caries in preschool children: Systematic review. Eur J Paediatr Dent 2016;17(2):113-21.
4. Crystal YO, Niederman R. Silver diamine fluoride treatment considerations in children's caries management: Brief communication and commentary. Pediatr Dent 2016; 38(7):466-71.
5. American Academy of Pediatric Dentistry. Policy on the use of silver diammine fluoride for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry; 2025:113-5.
6. Crystal YO, Rabieh S, Janal MN, Rasamimari S, Bromage TG. Silver and fluoride content and short-term stability of 38% silver diamine fluoride. J Am Dent Assoc 2019; 150(2):140-6.
7. Fung M, Duangthip D, Wong M, Lo E, Chu C. Arresting dentine caries with different concentration and periodicity of silver diamine fluoride. JDR Clin Transl Res 2016; 1(2):143-52.
8. Llodra JC, Rodriguez A, Ferrer B, Menardia V, Ramos T, Morato M. 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.
9. Zhi QH, Lo ECM, Lin HC. Randomized clinical trial on effectiveness of silver diamine fluoride and glass ionomer in arresting dentine caries in preschool children. J Dent 2012;40(11):962-7.
10. Cleary J, Al-Hadidi R, Scully A, et al. A 12-month randomized clinical trial of 38% SDF vs. restorative treatment. JDR Clin Trans Res 2022;7(2):135-44.
11. Clemens J, Gold J, Chaffin J. Effect and acceptance of silver diamine fluoride treatment on dental caries in primary teeth. J Public Health Dent 2018;78(1):63-8.
12. Sihra R, Schroth RJ, Bertone M, et al. 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;86:k9.
13. Schroth RJ, Bajwa S, Lee VHK, et al. An open-label, parallel-group, randomized clinical trial of different silver diamine fluoride application intervals to arrest dental caries. BMC Oral Health 2024;24(1):1036.
14. Featherstone JDB, Crystal YO, Alston P, et al. Evidence-based caries management for all ages – Practical guidelines. Front Oral Health 2021;2:657518.