# Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions\*

Dental caries affects about one out of four children ages two through five years.<sup>1</sup> Silver diamine fluoride (**SDF**), recently approved for use in the United States, has been shown to be efficacious in arresting caries lesions.<sup>2,3</sup> It is a valuable therapy which may be included as part of a caries management plan for patients. Caries lesions treated with SDF usually turn black and hard. Stopping the caries process in all targeted lesions may take several applications of SDF, and reapplication may be necessary to sustain arrest.



# Case selection for application of silver diamine fluoride

Patients who may benefit from SDF include those:

- with high caries risk who have active cavitated caries lesions in anterior or posterior teeth;
- presenting with behavioral or medical management challenges and cavitated caries lesions;
- with multiple cavitated caries lesions that may not all be treated in one visit;
- with dental caries lesions that are difficult to treat; and

• without access to or with difficulty accessing dental care. Criteria for tooth selection include:

- no clinical signs of pulpal inflammation or reports of unsolicited/spontaneous pain.
- cavitated caries lesions that are not encroaching on the pulp. 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.<sup>4</sup> Informed consent, particularly highlighting expected staining of treated lesions, potential staining of skin and clothes, and need for reapplication for disease control, is recommended.

# Clinical application of silver diamine fluoride

- Remove gross debris from cavitation to allow better SDF contact with denatured dentin.
- Carious dentin excavation prior to SDF application is not necessary. As excavation may reduce proportion of arrested caries lesions that become black, it may be considered for esthetic purposes.



SDF-treated lesions with temporary gingival staining

- A protective coating may be applied to the lips and skin to prevent a temporary henna-appearing tattoo that can occur if SDF comes into contact with soft tissues.
- Isolate areas to be treated with cotton rolls or other isolation methods. If applying cocoa butter or any other product to protect surrounding gingival tissues, use care to not inadvertently coat 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 (white-spot) lesions to avoid inadvertent staining.
- Careful application with a microbrush should be adequate to prevent intraoral and extraoral soft tissue exposure. No more than one drop of SDF should be used for the entire appointment.
- Dry lesion with gentle flow of compressed air.
- Bend microsponge brush. Dip brush into SDF and dab on the side of the plastic dappen dish to remove excess liquid before application. Apply SDF directly to only the affected tooth surface. Remove excess SDF with gauze, cotton roll, or cotton pellet to minimize systemic absorption.
- Application time should be at least one minute if possible. (Application time likely will be shorter in very young and difficult to manage patients. When using shorter application periods, monitor carefully at postoperative and recall visits to evaluate arrest and consider reapplication.)
- Apply gentle flow of compressed air until medicament is dry. Try to keep isolated for as long as three minutes.
- The entire dentition may be treated after SDF treatment with five percent sodium fluoride varnish to help prevent caries on the teeth and sites not treated with SDF.

<sup>\*</sup> Refer to AAPD 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

Estimations of SDF effectiveness in arresting dental caries lesions range from 47 to 90 percent with one-time application depending on size of the cavity and tooth location.<sup>4-7</sup> Anterior teeth have higher rates of arrest than posterior teeth.<sup>5</sup> Therefore, follow-up for evaluation of caries arrest is advisable.<sup>2-3</sup>

- Follow-up at two to four weeks after initial treatment to check the arrest of the lesions treated.
- Reapplication of SDF may be indicated if the treated lesions do not appear arrested (dark and hard). Additional SDF can be applied at recall appointments as needed, based on the color and hardness of the lesion or evidence of lesion progression.
- Caries lesions can be restored after treatment with SDF.
- When lesions are not restored after SDF therapy, biannual reapplication shows increased caries arrest rate versus a single application.

### References

1. Dye BA, Thornton-Evans G, Li X, Iafolla TJ. Dental caries and sealant prevalence in children and adolescents in the United States, 2011–2012. NCHS data brief, no 191. Hyattsville, Md.: National Center for Health Statistics. 2015. Available at: "https://www.cdc.gov/nchs/products/databriefs/db191.htm". Accessed September 6, 2017.

- 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.
- 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.
- 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.
- 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.
- 7. 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.