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Policy on the Use of Silver Diamine Fluoride for Pediatric Dental Patients

Background: Shortly after the deadline for posting CCA materials for advance review by the members the American Academy of Pediatrics' Section on Oral Health alerted the AAPD to some issues surrounding the use of silver diamine fluoride (SDF). The Section reports that many pediatricians, especially those with dental hygienists in their practice, are providing SDF. In addition, pediatricians are often billing SDF application as a "fluoride treatment" since most payors are not currently reimbursing for SDF. In addition, it was brought to our attention that many state Medicaid programs and dental boards are misunderstanding the proper use of SDF and appropriate coding, despite AAPD's excellent clinical practice guideline. Some are viewing it as equivalent to fluoride varnish and assuming it can be applied indiscriminately to teeth absent a dental diagnosis and supervision by a dentist.

Because this is a hot topic and fast-moving issue, your AAPD leadership does not want to wait another year before adopting an updated policy that addresses some of these issues. The board therefore directed the Council on Clinical Affairs to recommend some amendments to the Policy Statement on **Use of Silver Diamine Fluoride for Pediatric Dental Patients** that was adopted last year.

At its meeting on Tuesday, May 22nd, the Board of Trustees signed off on the attached update. Please note that it will need to be considered as New Business at the General Assembly, and will require a 2/3 vote for such consideration.

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Policy on the Use of Silver Diamine Fluoride for Pediatric Dental Patients[*]

Originating Council

Council on Clinical Affairs

Adopted

2017

Purpose

The American Academy of Pediatric Dentistry (**AAPD**) recognizes that dental caries continues to be a prevalent and severe disease in children. This policy addresses the use of silver diamine fluoride (SDF) as part of an ongoing caries management plan with the aim of optimizing individualized patient care consistent with the goals of a dental home. When SDF is indicated, it is essential that the infants, children, adolescents, or individuals with special health care needs receive a comprehensive dental examination, diagnosis and a plan of ongoing disease management prior to placement of the material. The dental profession has long viewed dental caries as an acute disease condition requiring surgical debridement, cavity preparation, and mechanical restoration of the tooth~~. Increasingly~~, but increasingly, especially for the infant and child population, practitioners are utilizing individually tailored strategies to prevent, arrest, or ameliorate the disease process based on caries risk assessment. One of these strategies employs ~~the~~ application of SDF as an antimicrobial and remineralization agent to arrest active ~~carious~~ caries ~~dental~~ lesions after diagnosis and at the direction of a responsible dentist of record.

Methods

This policy is a review of current dental and medical literature and sources of recognized professional expertise and stature, including both the academic and practicing health

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[*] **ABBREVIATIONS**
AAPD: American Academy of Pediatric Dentistry. **CaF** : Calcium fluoride. **SDF**: Silver diamine fluoride.

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communities, related to SDF and silver nitrate. In addition, literature searches of PubMed®/MEDLINE and Google Scholar databases were conducted using the terms: diamine silver fluoride and caries, Howe's solution, silver nitrate and caries, and silver diamine fluoride; fields: all; limits: within the last 15 years, humans, English, birth through age 99. One hundred eight articles matched these criteria. Papers for review were chosen from this list and from the references within selected articles. Expert and/or consensus opinion by experienced researchers and clinicians also was considered.

Background

Treatment of incipient caries usually involves early therapeutic intervention using topical fluoride, and non-surgical restorative techniques ~~like~~ such as dental sealants and resin infiltration. The use and outcomes of these techniques have been well-documented and there are current policies and guidelines with recommendations for their use in the practice of dentistry.[1-3] In contrast, treatment of ~~cavitated~~ caries lesions traditionally requires surgical intervention to remove ~~the~~ diseased tooth structure followed by placement of a restorative material to restore form and function ~~to the tooth~~. Barriers to traditional restorative treatment (e.g., behavioral issues due to age and/or limited cooperation, access to care, financial constraints) call for other alternative caries management modalities.

Silver topical products, such as silver nitrate and SDF have been used in Japan for over 40 years to arrest caries and reduce tooth hypersensitivity in primary and permanent teeth. During the past decade, many other countries such as Australia and China have been using this compound with similar success.[4,5] As marketed in the United States, SDF is a 38 percent silver diamine fluoride which is equivalent to five percent fluoride in a colorless liquid, with a pH of 10. The exact mechanism of SDF is not understood. It is theorized that fluoride ions act mainly on the tooth structure, while silver ions, like other heavy metals, are antimicrobial. It also is theorized that SDF reacts with hydroxyapatite in an alkaline environment to form calcium fluoride (**CaF_2**) and silver phosphate as major reaction products. CaF_2 provides sufficient fluoride to form fluorapatite which is less soluble than hydroxyapatite in an acidic environment.[6, 7] A side effect is the discoloration of demineralized or cavitated surfaces. Patients and parents should be advised regarding the black staining of the lesions associated

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with ~~the~~ application of SDF. Ideally, prior to ~~the~~ use of SDF, parents should be shown before-and- after images of teeth treated with SDF. Recently, the Food and Drug Administration approved SDF as a device for reducing tooth sensitivity and off- label use for arresting caries is now permissible and appropriate for patients.[8-12]

Many clinical trials have evaluated the efficacy of SDF on caries arrest and/or prevention,[6,9-11,13-33] although clinical trials have inherent bias (i.e., because of the staining), since the difference between control and treated teeth is obvious to the researcher. However, studies consistently conclude that SDF is indeed more effective for arresting caries[6, 9-11,15,16,18,20-33] than fluoride varnish. SDF reportedly also has approximately 2-3 times more fluoride retained than delivered by sodium fluoride, stannous fluoride, or acidulated phosphate fluoride (APF) commonly found in foams, gels and varnish.[28] Additionally, the use of SDF has not shown to reduce adhesion of resin or glass ionomer restorative materials.[6,28,29,34-37] The use of SDF is safe ~~poses little toxicity or fluorosis risk~~ when used in adults and children.[38-41] Placement of SDF should follow AAPD's Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesion. [41] ~~manufacturer's recommendations.~~ Delegation of the application of SDF to auxiliary dental personal or other trained health professionals, as permitted by state law, must be by prescription or order of the dentist after a comprehensive oral examination.

The ultimate decision regarding disease management and application of SDF are to be made by the dentist and the patient/parent, acknowledging individuals' differences in disease propensity, lifestyle, and environment.[42] Dentists are "required to provide information about the dental health problems observed, the nature of any proposed treatment, the potential benefits and risks associated with the treatment, any alternatives to the treatment proposed, and potential risks and benefits of alternative treatment, including no treatment." [43] The SDF informed consent, particularly highlighting expected staining of treated lesions, potential staining of skin and clothes, and the need for reapplication for disease control, is recommended. [41] Careful monitoring and behavioral intervention to reduce individual risk factors should be part of a comprehensive caries management program that aims not only to sustain arrest of existing caries lesions, but also to prevent new caries lesion development. [42] Although no severe pulpal damage or reaction to SDF has been reported, SDF should not be

91 placed on exposed pulps.[42] Therefore, teeth with deep caries lesions should be closely
92 monitored clinically and radiographically by a dentist [42]
93
94 SDF, when used as a caries arresting agent, is a reimbursable fee through billing to a third-
95 party payor, when submitted with the appropriate dental code recognized by the American
96 Dental Association's Current Dental Terminology. Reimbursement for this procedure varies
97 among states and carriers. Third- party payor's coverage is not consistent on the use of the
98 code per tooth or per visit. [42] Because there is a recommended code for SDF application,
99 billing the procedure using any other code would constitute fraud, as defined by the Federal
100 Code of Regulations. [44] The AAPD supports the education of dental students, residents, other
101 oral health professionals and their staffs to ensure good understanding of the appropriate
102 coding and billing practices to avoid fraud. [45]
103

104 ## Policy statement

105 The AAPD:

106 - Supports the use of SDF as part of an ongoing caries management plan with the aim
107 of optimizing individualized patient care consistent with the goals of a dental home.
108 - Supports third party reimbursement for fees associated with SDF.
109 - Supports delegation of application of SDF to auxiliary dental personnel or other
110 trained health professionals according to a state's dental practice act by prescription
111 or order of a dentist after a comprehensive oral examination.
112 - Supports a consultation with the patient/parent with an informed consent recognizing
113 SDF is a valuable therapy which may be included as part of a caries management
114 plan.
115 - Supports the education of dental students, residents, other oral health professionals
116 and their staffs to ensure a good understanding of appropriate coding and billing
117 practices.
118 - Encourages more practice-based research to be conducted on SDF to evaluate its
119 efficacy.
120

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