

Silver Diamine Fluoride (SDF) Fact Sheet

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What is SDF?

Silver diamine fluoride (SDF) has been used extensively outside the United States for many years for caries control.¹ SDF is a colorless liquid containing silver particles and 38% (44,800 ppm) fluoride ion that at pH 10 is 25% silver, 8% ammonia, 5% fluoride, and 62% water. This is referred to as 38% SDF.

What is the strength of evidence for SDF?

In clinical trials, SDF applied directly to the cavitated lesion outperformed fluoride varnish for the non-surgical arrest of caries in children and older adults. In addition, SDF demonstrated impressive caries prevention to adjoining teeth not receiving direct application of SDF.^{1,2} At least eight published reports of randomized clinical trials consistently demonstrated very high rates of caries arrest.^{3,4,5,6,7,8,9,10} Although a 2016 systematic review and meta-analysis of clinical trials in children that concluded that 38% SDF applied at least once per year effectively arrested more than 65% of active caries,¹¹ there is no consensus for the number and frequency of applications for optimal caries control.¹² A critical summary of the systematic review, published in early 2017, called for more well-designed and well-conducted clinical trials comparing the effectiveness of SDF with no treatment or other caries management approaches in populations with varying caries risk, lesion severities, and other fluoride exposures.¹²

Does SDF have FDA Approval?

In August 2014, SDF was approved by the Food and Drug Administration (FDA) as a desensitizing agent, similar to the off-label use of fluoride varnish 20 years-ago.¹³ As of early 2017, there is only one SDF product on the U.S. market. The FDA granted the manufacturer “breakthrough therapy status,” facilitating clinical trials of SDF for caries arrest.

What are indications for SDF use?

SDF arrests active carious lesions painlessly and without local anesthetic, as long as the teeth are asymptomatic, avoiding or delaying traditional surgical removal of caries. This intervention can be applied to teeth as soon as caries is detected. SDF is effective in treating people who are unable to access dental treatment or tolerate conventional dental care, including very young “pre-cooperative” children, persons with intellectual/developmental disabilities, or older adults.

What are contraindications for SDF therapy?

No adverse events using silver compounds have been reported in more than 80 years of use in dentistry.^{1,14} Silver allergy is the only known contraindication.² Teeth with evidence of pulpitis or pulpal necrosis are not appropriate for SDF treatment and require surgical treatment. Similarly, teeth with deep lesions where the carious dentin has been excavated are not candidates for SDF, due to the ammonia content and high pH which may create a pulpal reaction.

Are there other considerations for SDF therapy?

The silver particles in SDF darken active dental caries and temporarily stain unprotected soft tissues, which may be a concern with patient/parent acceptance. It does not stain sound enamel. Post-treatment application of potassium iodide solution reduces staining. Some individuals report a transient metallic taste after application of SDF. SDF will also permanently stain floors, clothing and furniture.

Silver diamine fluoride clinical presentation*



Figure 2: Arrested dental caries after silver diamine fluoride application



Figure 3: Black discoloration in anterior teeth after application of silver diamine fluoride



Figure 4: Black discoloration in pit and fissure after application of silver diamine fluoride

* Sabadini, GD. Used with permission, granted 01/03/2017.