

Silver Diamine Fluoride (SDF) Therapy



What is SDF?

Dental cavities affect about 1 out of 4 children aged 2-5 years. Silver diamine fluoride (SDF), recently approved for use in the United States (2014) has been shown to be effective in stopping cavities from growing. Silver topical products, such as Silver Nitrate and Silver Diamine Fluoride have been used in Japan, Australia and China for over 40 years to stop cavities and reduce tooth sensitivity in baby and adult teeth. It is a valuable therapy which may be included as part of a cavity management plan for children. Cavitated areas treated with SDF usually turn black and hard. Stopping the cavity process in all targeted areas may take several applications of SDF, and reapplication may be necessary to sustain cavities from growing.

How it works?

As marketed in the United States, SDF is a 38% silver diamine fluoride which is equivalent to 5% fluoride in a colorless basic liquid. The exact mechanism of SDF is not yet understood. It is theorized that fluoride ions act mainly on the tooth structure to mineralize, while silver ions, like other heavy metals, are antimicrobial. It also is theorized that SDF reacts in enamel with hydroxyapatite in an alkaline environment to form calcium fluoride (CaF_2) and silver phosphate. CaF_2 provides sufficient fluoride to form fluorapatite which is less susceptible to breakdown in an acidic environment.

Are there any side effects?

A side effect is the discoloration/black staining of cavitated surfaces. There is potential staining of skin that exfoliated in 10-14 days and permanent staining of

clothes. Transient gum irritation and a metallic taste have been reported. Children with true silver allergies should not have this agent applied; however, no systemic of severe allergic reaction have been reported. Recently, the Food and Drug Administration approved SDF as a safe product for reducing tooth sensitivity, and off-label use for arresting cavities as a permissible and appropriate treatment for patients.

Is SDF an effective and safe treatment?

Many clinical trials have evaluated the efficacy of SDF on caries arrest and/or prevention. Studies consistently conclude that SDF is indeed more effective for arresting cavities than fluoride varnish treatment. SDF reportedly also has approximately 2-3 times more fluoride retained in the teeth than delivered by sodium fluoride, stannous fluoride, or acidulated phosphate fluoride (APF) commonly found in foams, gels, and varnishes. The use of SDF is safe when used in adults and children. SDF cannot be placed on cavities of a certain size or those that are close to the tooth nerve. Therefore, teeth with deep cavities should be closely monitored clinically and radiographically by your dentist.

Is my child a good candidate for SDF treatment?

Your dentist will make a decision as to whether or not SDF is the right treatment options for your child. Cavities on baby teeth can grow quickly and can cause pain and infection. It is recommended to fix the cavity as soon as it is found, however, there are cases when fixing the cavity immediately is not possible. This can occur when the child is uncooperative, sick or too young to have treatment with laughing gas or anesthesia. It is not recommended to let the cavities grow because they can grow very fast and get to the point where they can no longer be fixed and would need to be pulled. If this is the case for your child, placing SDF on the cavities can potentially stop them from growing for a period of 6 months. This treatment is very fast to do (about 2 minutes), does not hurt and will require minimal cooperation from your child. The need for reapplication for disease control is recommended.

Why is follow-up important?

Estimations of SDF effectiveness in arresting dental cavities ranges from 47 to 90 percent with one-time application depending on the size of the cavity and tooth location. Teeth in the front have a higher rate of success than back teeth.

Therefore, follow-up for evaluation of cavity state is advisable. Follow-up is recommended at 2-4 weeks after initial treatment. Reapplication of SDF may be recommended if the treated area do not appear arrested (dark and hard). Additional SDF may need to be applied at recall appointments as needed every 3 to 6 months, based on the color and hardness of the area or evidence of if any evidence of cavity progression. Cavitated areas can be restored after treatment with SDF. When cavities are not restored after SDF therapy, biannual reapplication shows increased cavity arrest rate versus a single application. Darkened areas may be removed or hidden in the future with esthetic restoration once your child's behavior or age allows.

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