



Effectiveness of Silver Diamine Fluoride (SDF) at Arresting Dental Caries

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Purpose

The purpose of this study is to evaluate the clinical effectiveness of 38% silver diamine fluoride (SDF) at arresting dental caries for pediatric patients at BronxCare Health System.

Introduction

Management of dental caries has been a challenge in pediatric population due to its increase in prevalence. Silver diamine fluoride (SDF) is an anti-carries agent that is widely being used as a preventive treatment option at arresting active caries in children.

Silver diamine fluoride (SDF) is a liquid that combines the antibacterial effects of silver with the remineralizing power of fluoride.¹ SDF is the only dental material available that associates the remineralization of the dental structures provided by sodium fluoride with the antibacterial effect on the caries microorganisms by the action of silver nitrate.² SDF was first approved by the U.S. Food and Drug Administration (FDA) in 2014 as a topical antimicrobial and remineralizing agent to treat tooth sensitivity. In 2016, FDA further designated SDF as a "breakthrough therapy" and approved application of SDF as a drug to treat severe early childhood caries.³

SDF effectiveness in arresting dental caries lesions has ranged from 47 to 90 percent with one-time application depending on size of the cavity and tooth location.⁴ Furthermore, SDF has been identified as an anti-carries agent that successfully arrests dental decay and has the potential to address the epidemic of untreated decay in our pediatric population.⁵

Methods

This is a retrospective chart review evaluating pediatric patients ages 1 to 7 years old at BronxCare Health System who received at least one application of SDF. Patients treated with SDF from January 2016 – January 2021 who were compliant with their follow-up visits upon SDF application will be analyzed. Patients who did not return for their follow-up visits will be excluded from the study. Caries arrest will be determined by clinical examination/findings which include tactile probing with explorer and change of color (discoloration) upon SDF application.

Results

Figure 1: Percentage of Tooth Surface Treated with SDF

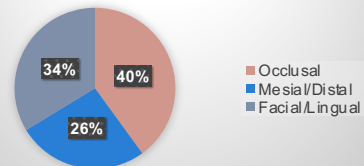


Figure 2: Percentage of Tooth Surface Arrested with SDF

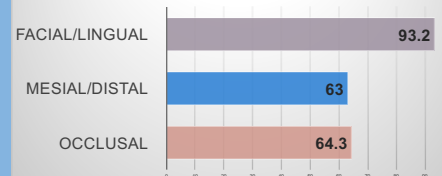
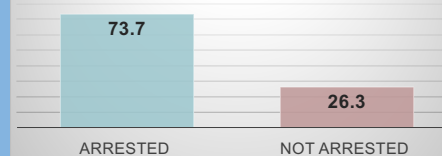


Figure 3: Arrested Caries with SDF (%) at 3-4 Weeks Follow Up



Of the 175 charts analyzed in this study, the percentage of SDF treated teeth surfaces were 40% occlusal, 34% facial or lingual, and 26% mesial or distal (Figure 1). At 3-4 weeks follow up, facial or lingual surfaces displayed the highest caries arrest rate (93.2%), followed by occlusal surface (64.3%) and interproximal surfaces (63%) (Figure 2). Overall caries arrest rate of SDF treated teeth was 73.7% when evaluated at 3-4 weeks follow up (Figure 3).

Discussion

In this study, SDF effectiveness was strongly associated with the surfaces of teeth. Facial and lingual surfaces demonstrated the highest rate of caries arrest, which suggests that direct visibility of carious lesion may determine the effectiveness of SDF. These findings also support previous studies which indicated that smooth surface lesions had a higher rate of caries arrest with SDF due to their easy accessibility and cleansability.⁶

Limitation of this study includes bias from multiple providers determining caries arrest. Follow-up evaluations by a single provider may improve consistency in future studies. Also, another limitation is the lack of multiple follow-up visits when caries were arrested. Even with arrested caries, future studies suggest the need for additional follow ups, e.g. 3 months, 6 months, or more.

Conclusion

Overall caries arrest rate of SDF treated teeth was 73.7% in this population. Facial or lingual surfaces displayed the highest caries arrest rate (93.2%), compared to occlusal and interproximal surfaces.

References

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