Silver Diamine Fluoride Effectiveness by Tooth Surface Location at 12-18 Month Recall

Sheila Kaushik, DDS, Nathan Lo, DDS, Lenny Mayorga, DDS, Courtney H. Chinn, DDS, MPH

Department of Pediatric Dentistry, New York University College of Dentistry, New York

Introduction/Background

Within the field of pediatric dentistry, Silver Diamine Fluoride (SDF) has been used to successfully treat early carious lesions in children. This treatment has shown to be an effective non-invasive option for treating superficial caries. Cleared by the FDA and used for decades in other countries, use of SDF in US pediatric populations has grown rapidly but has not been fully explored. The purpose of this retrospective chart review is to determine the status of unarrested cavitated tooth surfaces that received SDF in children 12-18 months after initial application and if tooth type, surface, or location was significantly associated with successful caries arrest.

Methods

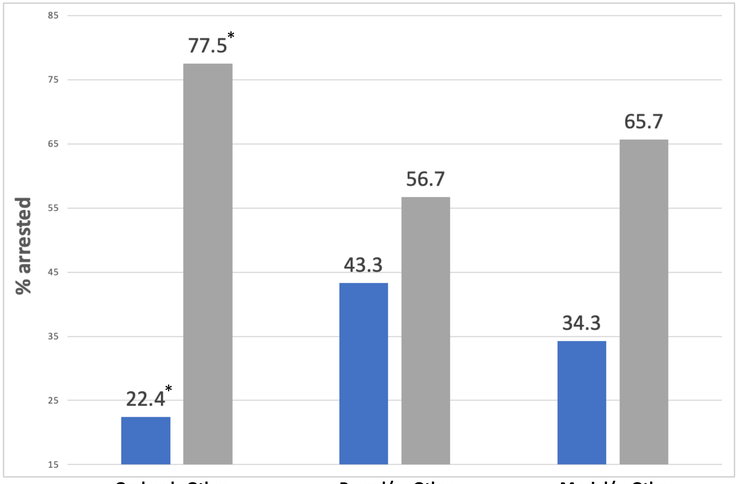
Approval was obtained from the Institutional Review Board of the NYU School of Medicine (IRB i20-01725) and included analysis of electronic health information of patients who were 1) under 9 years of age, 2) attended the NYU College of Dentistry post-graduate pediatric dental clinic, 3) received initial SDF application (*Advantage Arrest*™) on at least one asymptomatic cavitated lesion between December 2015 to January 2021, and 4) received a periodic examination within 12-18M of initial SDF application. Data analysis was conducted using a statistical software package (JASP) to test significant association for caries arrest at 12-18M by tooth surface and location.

Results

Table 1.0: Tooth Surface and Location at Initial SDF Application and Status at 12-18 Months Recall (n=186)

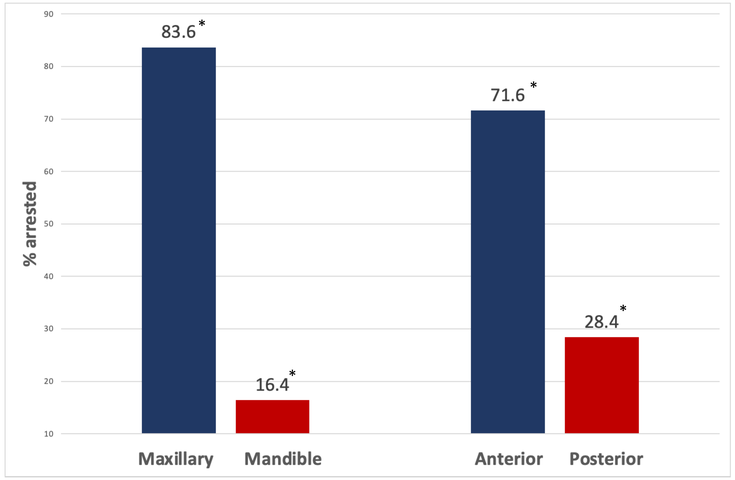
Tooth Surface/Location at Initial Visit	Count	Percent
Buccal or Lingual	60	32.3%
Occlusal	65	34.9%
Maxillary	124	66.7%
Anterior	96	51.6%
Surface Status at 12-18M RC	**Count**	**Percent**
Cavitated - arrested	67	36%
Cavitated - unarrested	84	45.2%
Extracted due to caries	14	7.5%
Filled due to caries	21	11.3%

Figure 1.0: Percentage of SDF treated Tooth Surfaces Arrested at 12-18 Month Recall by Surface Location (n=151)



* Indicates p value < 0.05

Figure 2.0: Percentage of SDF treated Tooth Surfaces Arrested at 12-18 Month Recall by Tooth Location (n=151)



* Indicates p value < 0.05

Results (cont.)

A total of 186 dental charts were reviewed. 51 subjects satisfied the inclusion criteria which included 186 tooth surfaces that received SDF at initial visit. Of these, 32.3% of surfaces were on the buccal or lingual, 34.9% occlusal, and 32.8% mesial or distal. 51.6% were located on an anterior tooth, 48.4% on a posterior tooth and 66.7% of surfaces on the maxillary arch.

Table 1.0 displays status by surface (n=186) when evaluated at a 12-18 month recall. These results indicate that of all cavitated lesions treated by SDF, 36% presented as unrestored and arrested, 45.2% as unrestored and unarrested, 7.5% as extracted due to caries, and 11.3% as restored due to caries.

Figure 1.0 shows the percentage of arrest at 12-18M RC by surface location. Occlusal surfaces were found to have a significantly lower arrest rate ($p<0.05$) compared to other surfaces (22.4% vs. 77.5%). No significant differences were found for buccal/lingual or for interproximal surfaces.

Figure 2.0 shows the percentage of surfaces arrested at 12-18M RC by tooth location. 52.8% of maxillary treated surfaces compared to 24.4% of mandibular surfaces were arrested, and 53.9% of anterior surfaces compared to 30.6% of posterior surfaces were arrested with both comparisons showing statistical significance ($p<0.05$).

Conclusions/Summary

As a retrospective chart review, this study was limited in that no standardization of determining caries arrest was formally conducted as part of this study. Additionally, this study did not explore the impact of multiple SDF applications.

Tooth surface location could be important in successful caries arrestation following SDF application. Maxillary and anterior surfaces both demonstrated statistically significant higher rates of arrest compared to their counterparts. Previous studies have demonstrated higher caries arrest rates in anterior teeth and in buccal/lingual smooth surfaces indicating that accessibility and/or visibility of the carious lesion is a possible important factor in determining the effectiveness of SDF.

Overall caries arrestation rate of SDF treated surfaces at 12-18M RC was 36%, including extracted and restored surfaces, and 44.35% when excluding, considerably lower than previously reported arrestation rates which are as high as 81%. This disparity introduces questions of the intended use of SDF in the pediatric dental profession as a definitive treatment. Further research on SDF and its intended use by pediatric dentists is necessary.

References

Information available upon request.