

Efficacy of SDF for Interproximal Caries in Posterior Primary Dentition

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Background

- Proving that Silver Diamine Fluoride (SDF) effectively arrests interproximal caries would offer more non-surgical interventions for children experiencing interproximal caries.³
- Silver Diamine Fluoride is a colorless liquid solution containing ammonia and silver fluoride.⁵ Ammonia acts to stabilize the silver fluoride ion making it active once applied to the tooth surface.⁵ While the silver strengthens the tooth, the fluoride acts to remineralize the demineralized enamel.⁶
- Atraumatic interventions have become more popular in recent times due to the ability to avoid more drastic interventions for children with dental caries.
- Multiple studies have been conducted showing a high efficacy of SDF in arresting carious lesions found on occlusal and smooth surfaces.^{2, 6}
- Only one study has been published assessing the incidence of interproximal caries arrest following SDF application in primary dentition.⁴
- As such, the purpose of this study is to evaluate the efficacy of SDF treatment in arresting posterior interproximal caries lesions in the primary dentition by conducting a prospective study.

Materials and Methods

- This study took place at a Cincinnati Children's Hospital Medical Center and was approved by its Institutional Review Board (IRB # 2022-0195).
- The inclusion criteria are healthy children, cooperative for radiographs, posterior primary teeth in contact with interproximal carious lesions with an International Caries Classification and Management System (ICCMS) score between RA1-RA3. All lesions were rated by the same two investigators, both pre- and post-treatment, and compared to insure inter-rater reliability.
- The teeth must have no previous restoration or SDF treatment. Patients may have other restorative needs to be addressed, but not on adjacent surfaces, the teeth with carious lesions being treated with SDF for this study must only be present on interproximal surfaces. SDF was applied in standard fashion by study staff.
- Subjects were scheduled for reapplication of SDF three months after initial application, at which time SDF was applied in the same manner as the initial application. Subjects were then scheduled for an exam 3 months after their second SDF application and six months from the initial diagnosis for new bitewing radiographs (in accordance with radiographic prescription recommendations from AAPD).⁶ The lesions were assigned an ICCMS rating and compared to the pre-treatment rating.
- If the values were the same, the lesion is determined to be arrested. If it is greater than the initial value, the lesion is determined to have progressed.



#T-M
Rater 1: 0
Rater 2: 0

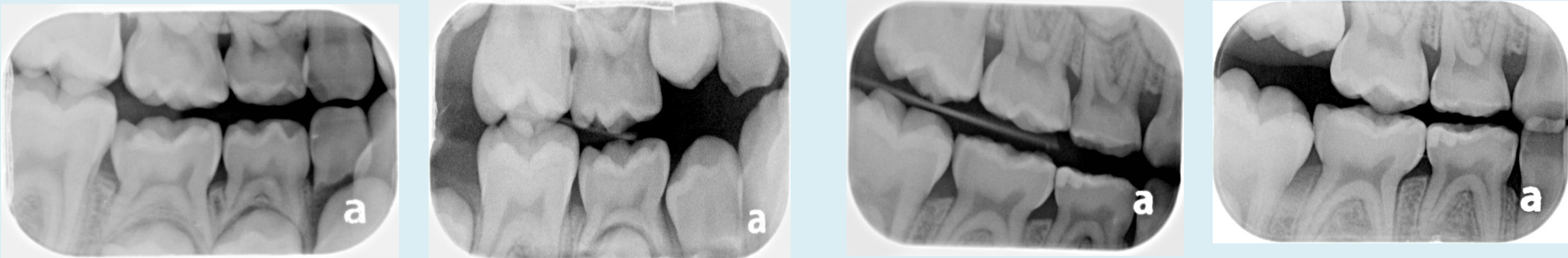
#T-M
Rater 1: RA1
Rater 2: RA1

#A-M
Rater 1: RA2
Rater 2: RA2

#S-D
Rater 1: RA3
Rater 2: RA3

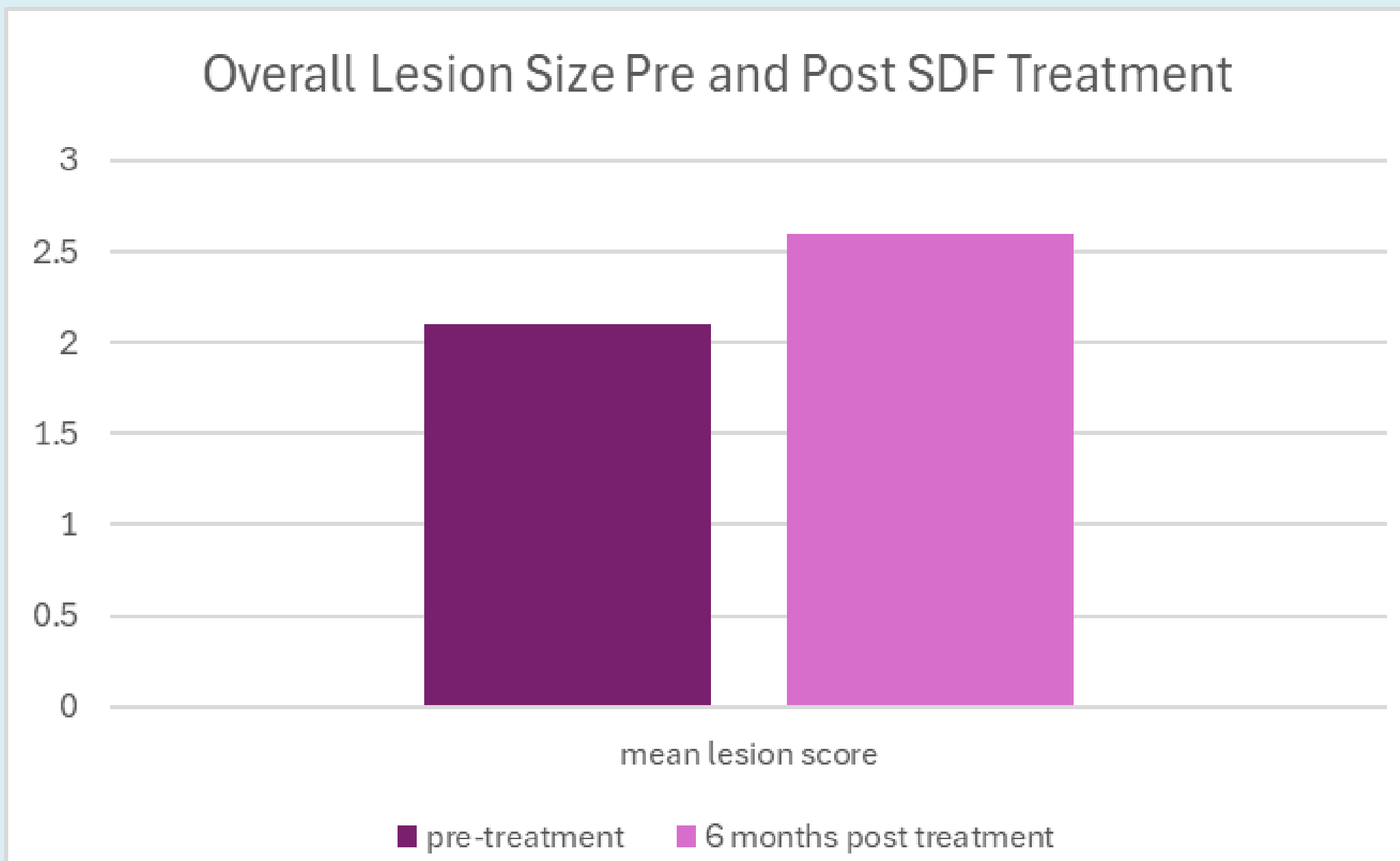
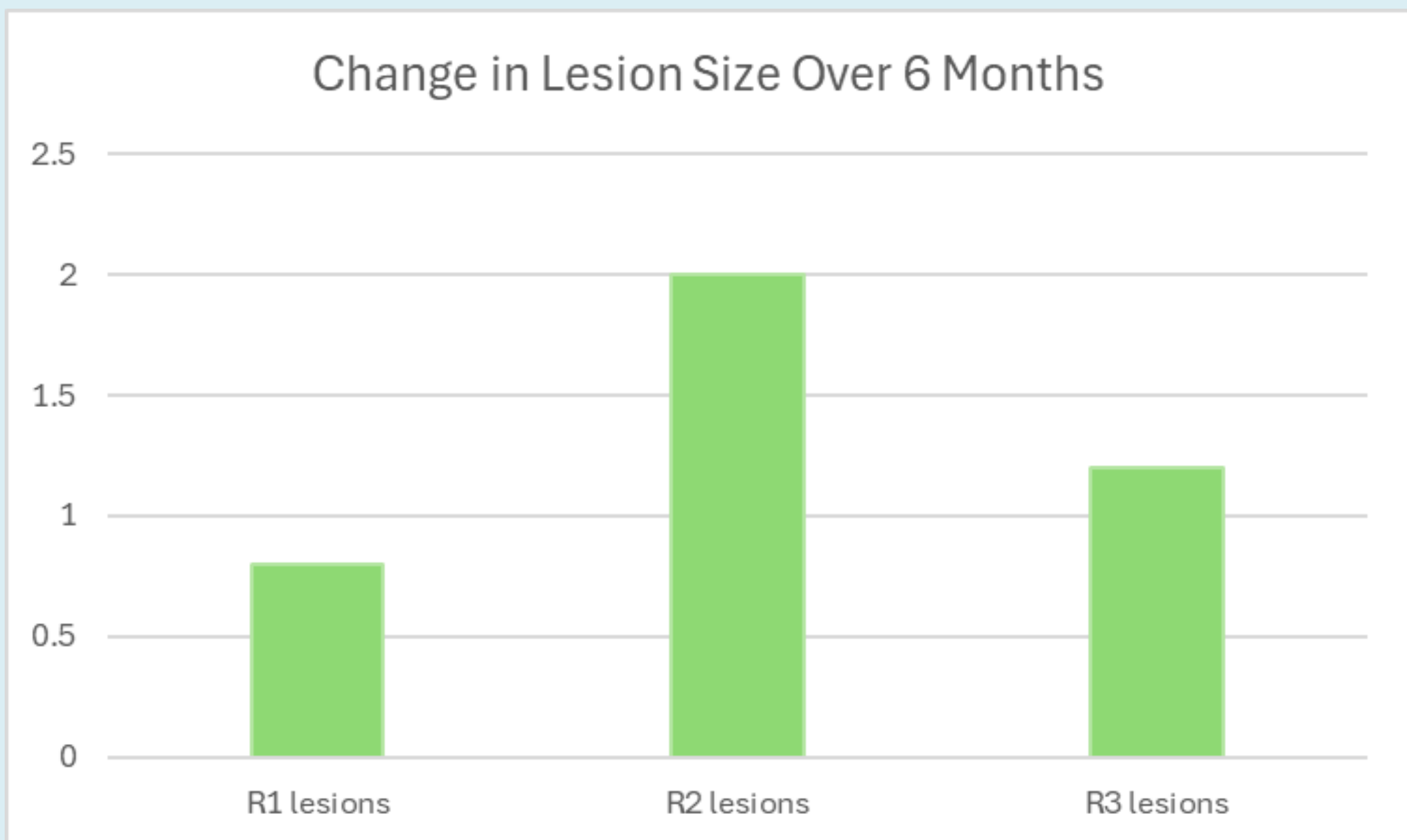
#B-D
Rater 1: RA4
Rater 2: RA4

Inter-rater reliability = 0.9



R1 lesion showing resolution (#T-M)

R2 lesion showing growth (#B-D)



Results

- 39 patients, with a total of 75 carious lesions, were enrolled and initially treated with SDF.
- 14 patients, with a total of 27 carious lesions, had initial SDF applied, a 3-month reapplication and a 6-month post application radiograph taken.
- 25 patients, with a total of 48 carious lesions, were excluded from final data collection due to provider error in application, patient's being lost to follow up, and/or deviance from study protocol.
- Mean starting score for all lesions = 2.1 ± 0.76
- Mean 6-month post-op for all lesions = 2.6 ± 1.4
- There was a significant increase of lesion size initially rated RA2 in comparison to those initially rated RA1. ($p = 0.036$)

Conclusions

- Overall, lesions increased in severity over a 6-month period when SDF was applied at the initial visit and at a 3 month follow up visit.
- SDF is a reasonable treatment option to help postpone more invasive treatment when behavior, scheduling, or other factors preclude patient from being able to complete definitive treatment.
- R1 lesions may be best suited for treatment with SDF.
- It is hard to control for oral hygiene and dietary habits of patients which could have affected results.
- A larger sample size would allow more definite conclusions to be drawn.

References

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