Retrospective Caries Progression in Primary, Permanent, and SDF-Treated Teeth

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INTRODUCTION

- Dental caries is a largely preventable disease affecting one in five children in the United States.[1]
- The 2024 CDC Oral Health Surveillance Report found that nearly half of children aged 6-9 have had cavities in their primary or permanent teeth.[2]
- In permanent teeth, interproximal enamel lesions typically take 3-4 years to progress into the dentinoenamel junction (DEJ) where treatment such as dental fillings or crowns will be needed.[3]
- Primary teeth, on the other hand, have thinner enamel causing caries to reach the DEJ more quickly.[4]
- Silver diamine fluoride (SDF), is a commonly used non-invasive treatment that has proven effective in preventing caries progression by arresting cavitated caries lesions.[5]
- This study focuses on the comparison of dental caries progression in primary teeth, permanent teeth, and teeth treated with SDF in children and adolescents.

PURPOSE

- To evaluate the progression of incipient dental enamel lesions in children and adolescents, including teeth that were treated with SDF during 2020-2024.
- This study aims to answer the following questions:
  - (1) In children, what is the progression of incipient enamel lesions to DEJ in primary teeth?
  - (2) In children and adolescents, what is the progression of interproximal enamel lesions to the DEJ in permanent teeth?
  - (3) In children and adolescents with SDF treated teeth, what is the progression of incipient interproximal caries to the DEJ?

METHOD

- This retrospective study includes patients between 3 to 16 years old seen at the pediatric dental residency program based in San Diego.
- Three calibrated sub-investigators evaluated baseline and two periodic radiographs over a period of 12 months for radiographic lesion progression.
- Interproximal lesions were evaluated using the ICCMS system and categorized based on non-SDF treated primary or permanent dentition versus SDF-treated primary or SDF- treated permanent dentition.
- Outcomes were recorded as no progression, progression, regression, or restored.

FIGURE 1

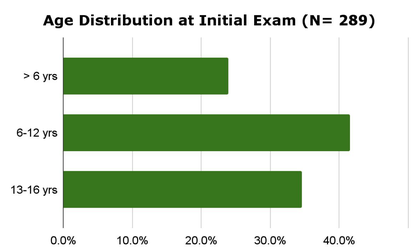


FIGURE 2

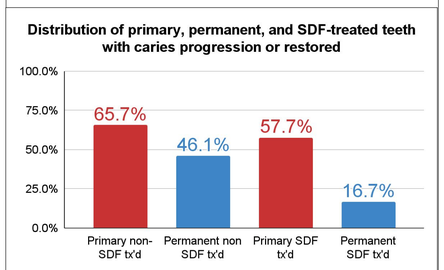
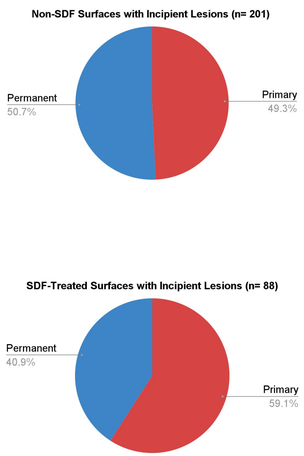


FIGURE 3



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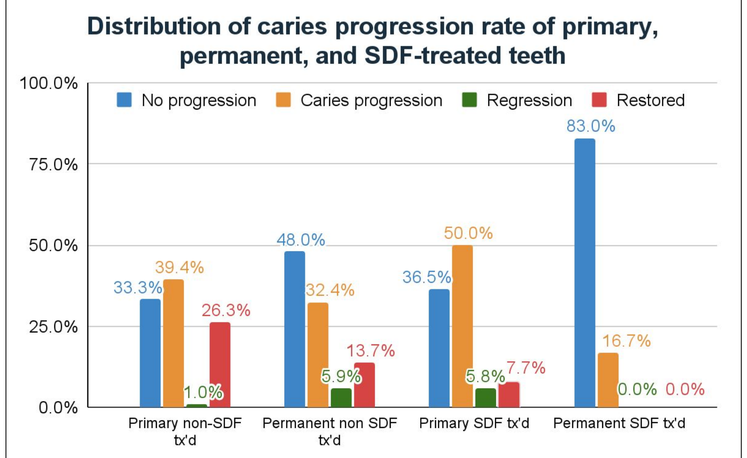

RESULTS

- Out of the non-SDF treated primary lesions, 65% progressed passed the DEJ or required treatment, versus 46% of non-SDF treated permanent lesions that progressed or required treatment (*P*=.012).
- Of the teeth treated with SDF, 83% of permanent teeth (n=36) and 37% of primary teeth (n=52) showed no caries progression (*p*<.001).
- Out of the non-SDF treated lesions, 20% were restored within 12 months versus 4.5% of SDF treated lesions being restored (*P*=.02).
- The most commonly restored tooth for both non-SDF treated and SDF-treated was the primary second molar.
- Of the recorded permanent teeth that were treated with SDF, none were restored over the course of the 2 follow up examinations.

CONCLUSIONS

- Interproximal incipient caries in primary teeth left untreated are likely to progress past the DEJ within one year compared to permanent teeth.
- Silver diamine fluoride placed on interproximal incipient caries were significantly less likely to be restored than non-SDF treated lesions in both primary and permanent dentition.
- More long-term prospective studies and randomize-control trials evaluating the effects of SDF and other preventive medications in interproximal lesions in primary and permanent teeth are indicated.

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