

## BACKGROUND

Interproximal caries of primary molars are prevalent in children.<sup>1</sup> Since FDA approval in 2016 for its use as a caries arresting agent, topical application of silver diamine fluoride (SDF) has been proposed as an alternative to restorative treatment for managing carious lesions.<sup>2</sup> The medicament has been shown to arrest 81% of dental carious lesions, with a high degree of success in treating interproximal carious lesions limited to the enamel.<sup>3,4</sup> Evidence for SDF's effectiveness for interproximal lesions at or slightly past the dentin-enamel junction (DEJ), however, remains limited. Few studies have compared the effectiveness of SDF based on the depth of the interproximal lesion.

## PURPOSE

The purpose of this study is to compare the effectiveness of treatment with 38% silver diamine fluoride for arresting interproximal carious lesions of different depths (in the outer half of the enamel, within the inner half of the enamel, and within the outer 1/3 of dentin past the DEJ).

## METHODS

IRB approval was obtained. The study was conducted at the Herman Ostrow School of Dentistry's Pediatric Dentistry Clinic and the Children's Hospital Los Angeles. Pediatric dental patients (ASA I or II and between the ages of 3 and 12) with incipient carious lesions on primary molars were recruited. The initial lesion depths were classified into three groups by the treating practitioner using the International Caries Classification and Management System (ICCMS): radiolucency in the outer half of the enamel (RA 1), within the inner half of the enamel but not past the dentin-enamel junction (RA 2), and within the outer 1/3 of dentin past the DEJ (RA 3). Lesions that progressed further than within the outer 1/3 of dentin were not included when recruiting patients, as restorative treatment for lesions of this size is usually indicated. The participants were randomly assigned to one of three treatment groups: (1) 38% SDF applied with Super Floss + fluoride varnish application, (2) 38% SDF applied with a microbrush + fluoride varnish application and (3) fluoride varnish application only (control). For the purposes of analyzing lesion depth for this presentation, we combined group (1) and (2) to form a singular group who received 38% SDF + fluoride treatment.

The participants returned for re-application of SDF (3 months, 6 months) and radiographic evaluation (6 months, 12 months). Three independent raters evaluated the radiographs according to the ICCMS classifications. A lesion was deemed to have progressed if the ICCMS classification at the 6-month and/or 12-month assessments was higher than the ICCMS classification at 0 months.

## RESULTS

A total of 123 interproximal carious lesions from 30 participants were analyzed. Of the 123 interproximal lesions, the initial lesion depth was RA 0 for 15 lesions, RA 1 for 38 lesions, RA 2 for 41 lesions, RA 3 for 24 lesions, and RB 4 or higher for 6 lesions. Lesions of depths RA 0 (no lesion present) and RB 4 or higher (cariou lesion extending into or past the middle 1/3 of dentin) were still included in the analysis since these grades were given by the three raters after recruitment into the study. Within the 12-month period defined by the study, lesion progression was observed in 27% (3/11) of the RA 0 SDF group, 38% (11/29) of the RA 1 SDF group, 18% (5/28) of the RA 2 SDF group, 6% (1/17) of the RA 3 SDF group, and 100% (2/2) of the RB 4 or higher group (Figure 1). While 41.1% (14/34) lesions progressed in the fluoride group, only 25.7% of lesions progressed in the SDF group (Figure 2).

Figure 1: Percentage of Interproximal Carious Lesions in Primary Teeth that Progressed Following 38% SDF Treatment vs. Initial Lesion Size

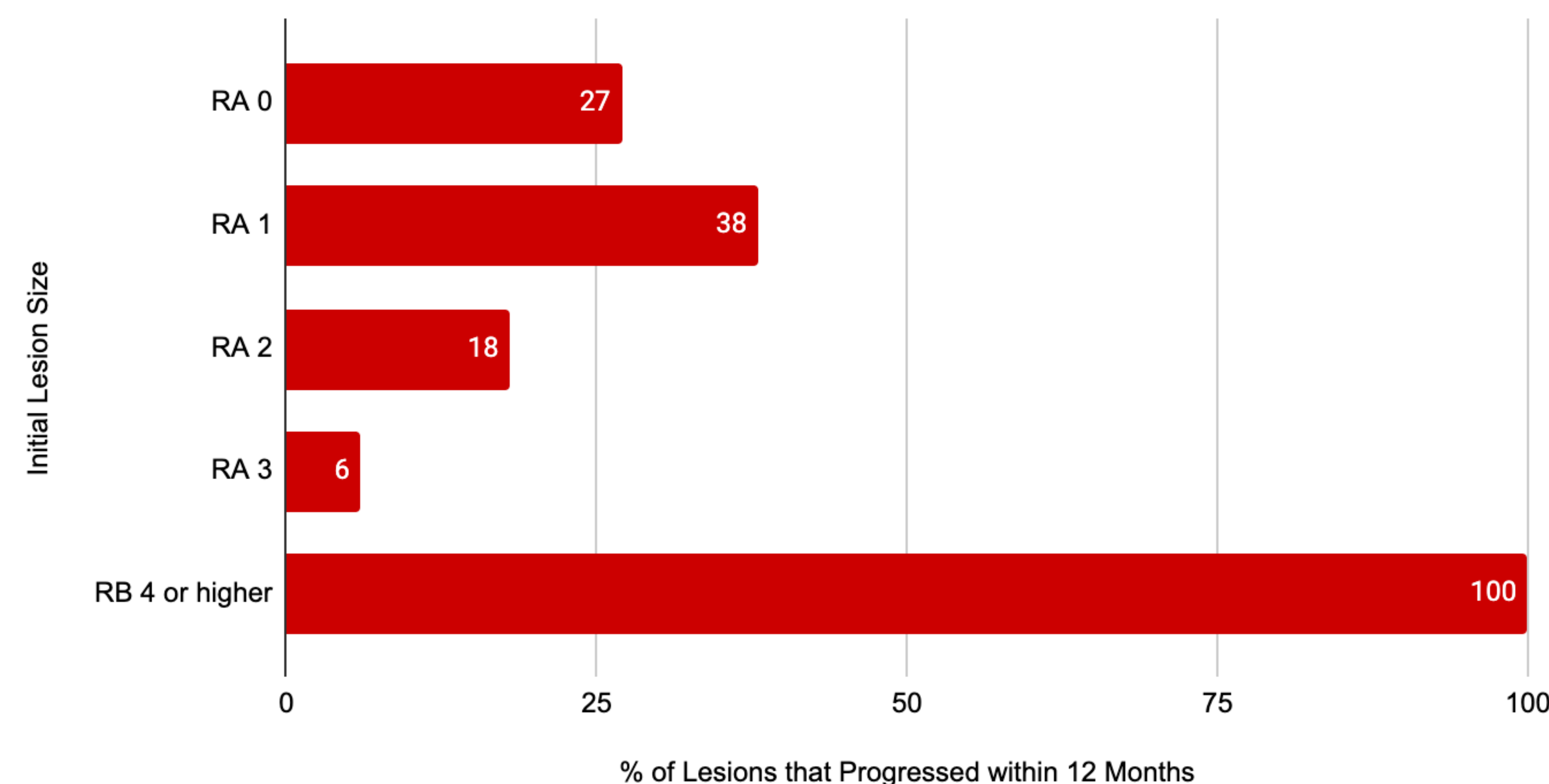
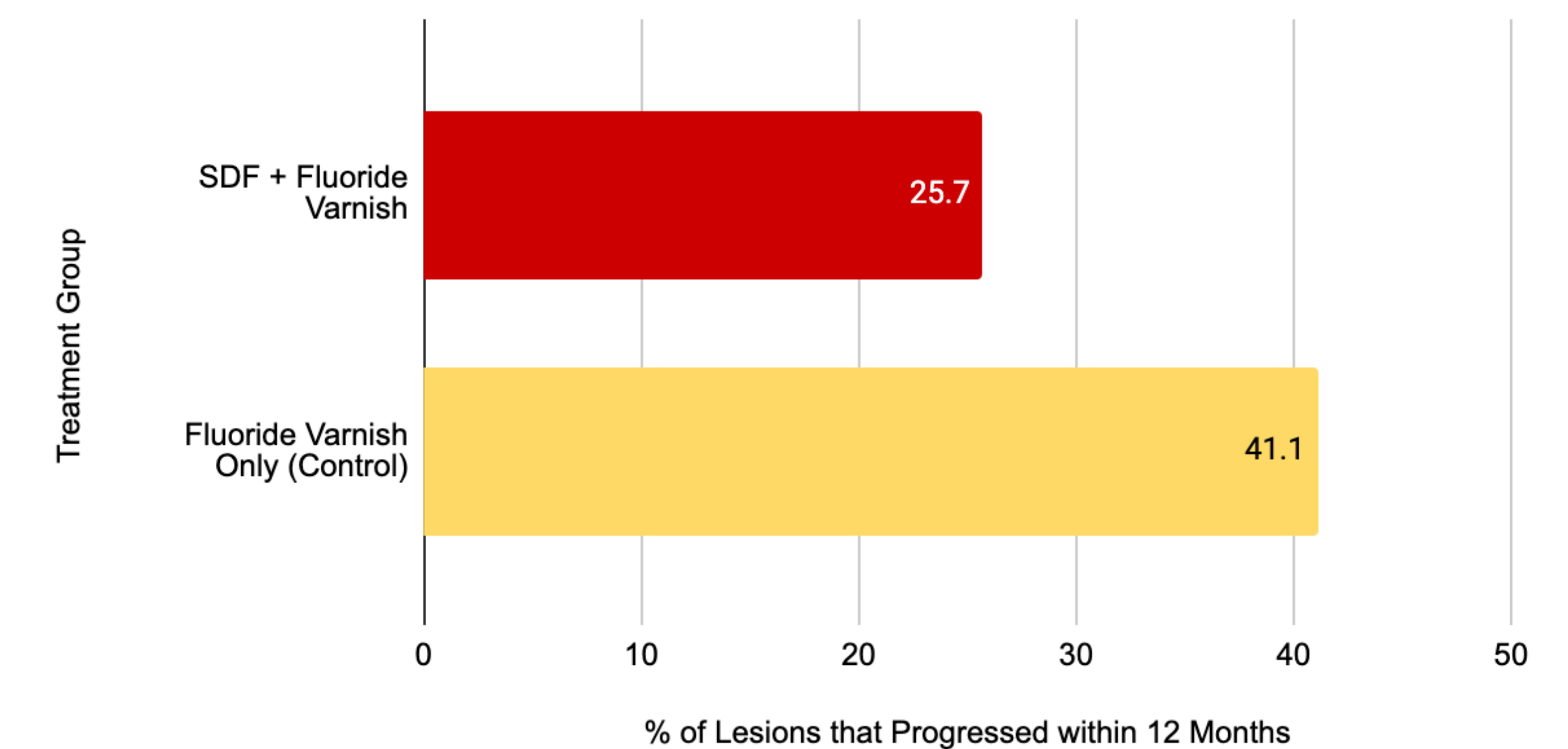


Figure 2: Effectiveness of 38% SDF (for All Lesion Sizes) vs. Control



## CONCLUSIONS

Despite the high degree of success with treating lesions within the enamel in previous studies, this pilot study indicates that treating interproximal lesions within the enamel (RA 1 and RA 2) may not cease lesion progression more effectively than treating lesions within the outer 1/3 of dentin (RA 3).

The findings also suggest that the application of 38% SDF, even for lesions within the enamel, is not predictable in its effectiveness and requires consideration of several other factors (caries risk, hygiene, application method, etc.). In consideration of the small sample size and limitations of this study, more studies should be conducted to confirm these findings.

### References:

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