Efficacy of Silver Diamine Fluoride Treatment for Primary Maxillary Incisors

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BACKGROUND

- Dental caries is the most common chronic disease present in pediatric populations worldwide.[1, 2]
- When applied topically, 38 % Silver diamine fluoride (SDF) functions as a non-invasive, cost-effective desensitizing agent and interim caries-arresting medicament in primary and permanent teeth. [1, 3, 4, 5]
- Two-thirds of all carious lesions in primary teeth treated with SDF were arrested two years after initial SDF application, with one or two re-applications per year. [3, 5]
- One study showed that when applying 38% SDF every 6 months, the success of arresting caries was 84.8%, and anterior teeth have a higher rate of caries arrest. [3, 6]

OBJECTIVES

- The objective of this retrospective study is to determine ***whether SDF is a definitive treatment for primary maxillary central and lateral incisors*** as determined by the need for additional restorative treatment post-SDF application, as well as what factors may influence that efficacy.

METHODS

- IRB approved study: Study #2020-0773
- 138 charts were reviewed for patients who had SDF applied to primary maxillary incisors spanning 3.5 years timeframe.
- Variables included tooth and surfaces to which SDF was applied, age at initial application, number of applications, behavior, use of fluoride varnish at time of application, and additional treatment required, including composite resins, crowns, extractions, or sedative fillings and use of sedation or general anesthesia.
- Descriptive statistics were completed by a Hospital Research statistician. Significance was set at $p < .05$

RESULTS

138 patients received two or more applications of SDF on #D-G.

Less than half of patients who had SDF applied required additional treatment:

- 46% (64/138) required additional treatment.
- Average age at initial application: 2.6 years
- The most common additional treatment was resin treatment (including resin strip crowns), followed by extractions then zirconia crowns.

Many patients who needed additional treatment required general anesthesia or sedation to complete treatment:

- 83% (38/46) of patients treated with resins were treated under general anesthesia for additional treatment.
- 100% (6/6) of patients who were treated with zirconia crowns were treated under general anesthesia.
- 95% (20/21) of patients treated with extractions were under some form of sedation (oral sedation or general anesthesia)

Fluoride varnish makes a difference:

- 34% (22/64) of patients who NEEDED additional treatment received topical sodium fluoride varnish at some point during application
- 55% (41/74) of patients who did NOT require additional treatment had received 5% topical sodium fluoride varnish at one or more treatment applications ($p<0.0205$)

Behavior during applications plays an important clinical role in success of SDF:

- 75% (95/127) of subjects with recorded behavior exhibited negative behavior at one or more application appointments.
- 51% of patients with recorded negative behavior recorded (48/95) required additional treatment
- 34% of patients with positive behavior recorded (11/32) required additional treatment

Effect of multiple surfaces requiring SDF:

- 83% (115/138) of patients received SDF on 3 or fewer surfaces
- 32% of patients (21/64) that required an extraction after SDF placement had an average of 3 surfaces treated

CONCLUSIONS

SDF is an effective treatment for primary maxillary incisors as more than half of patients receiving SDF did not require additional treatment.

5% NaF Varnish application following SDF was shown to be effective in reducing likelihood of additional treatment required.

Case selection is critical. Patients who exhibited negative behavior were more likely to require additional treatment.

- Therefore, these patients may warrant more frequent follow up and close monitoring for additional treatment intervention.
- Patients who required additional treatment were more likely to require some form of sedation or general anesthesia to complete treatment.

LIMITATIONS/NEXT STEPS

Provider Consistency: Due to the nature of our clinic, patients were unable to be seen by the same providers for each application.

- Sometimes throughout application visits, additional surfaces would be added to various teeth.
- For data collection purposes, we separated teeth into categories based on the maximum number of surfaces for application.

Recorded Behavior: When recording behavior, sometimes patients exhibited Neg/Neg, Neg/Pos, Pos/Neg, Pos/Pos. If a patient had any negative behavior recorded at any application visit, they were automatically measured as negative behavior.

- 11 of 138 subjects did not have recorded behavior

Patient demographics: The average age of most of our applicants was 2.6 years

- Data set not equally representative
- May have influenced likelihood for negative behavior
- 59% of patients had less than or equal to two surfaces, which could have influenced rate of arrest or skewed data in positive direction

Additional treatment: When evaluating additional treatment, 9 patients had more than one additional treatment, causing our total to became 73 (instead of 64).

Next Steps:
Further research recommended with larger, more representative data set.

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