

SDF Application and Its Impact on Tooth Extraction

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PURPOSE:

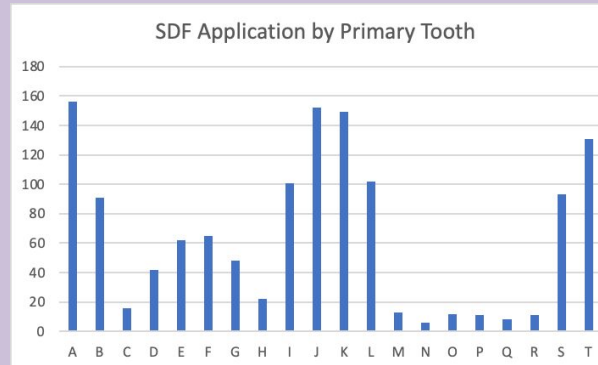
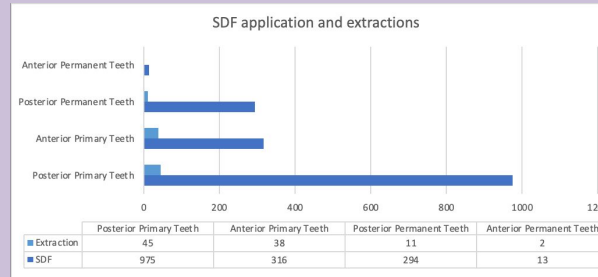
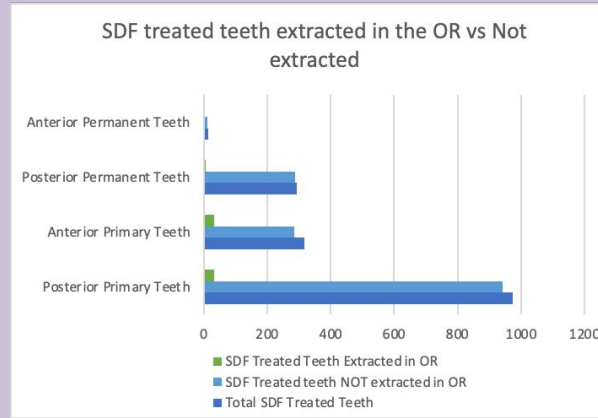
This study aimed to compare the relationship between the placement of 38% Silver Diamine Fluoride (SDF) on teeth and the likelihood that they will be extracted in the subsequent complete oral rehabilitation (COR) appointment under general anesthesia (GA).

INTRODUCTION:

Caries is the most common chronic disease of childhood. Approximately 60% of children experience caries by age 5. Untreated caries can result in pain, life-threatening infections, poor nutrition, early loss of teeth with subsequent orthodontic sequelae, sleep disturbances and decreased quality of life. Some children with caries can be treated in a dental office, but others are unable to cooperate. This can be due to young age, extreme fear and anxiety or special health care needs. These children often require general anesthesia, which can be difficult to access, especially with wait times up to 12 months. A minimally invasive option for treatment is silver diamine fluoride (SDF). SDF and other silver products have been used in Japan for over 40 years to arrest caries and reduce tooth sensitivity. The United States Food and Drug Administration has approved SDF for reducing tooth sensitivity, and off-label use for arresting caries. In the U.S., SDF is a 38% silver diamine fluoride, which is equivalent to 5% fluoride. Current studies indicate the fluoride ions act by remineralizing enamel and dentin, while the silver ions have an antimicrobial effect mainly in the treated carious dentin. Silver and fluoride create an unfavorable environment for collagen enzyme activation thereby reducing dentin degradation. A side effect is the permanent black discoloration of demineralized or cavitated surfaces.

METHODS:

1. A chart review of 699 children from the Children's Hospital of Pittsburgh, Pediatric Dental Clinic with carious lesions to which SDF was applied, from January 2019 to November 2023 was conducted. There were a total of 1598 teeth included in this study.
2. Treatment of each tooth was then categorized as either restored or extracted.
3. Pearson's Chi-squared test was performed to determine if there was a relationship between the placement of SDF on teeth and the likelihood that they be extracted.



RESULTS:

Of the 1598 teeth that had SDF placement in this timeframe, 96 teeth were subsequently extracted, the majority of which were extracted in the OR (73). These results were significantly significant. This means we are rejecting the null hypothesis that there is no random relationship between the placement of SDF on teeth and the likelihood they be extracted ($p=2.2e-16$). This means we have statistical evidence to suggest that there is, indeed, a relationship between the two variables. This is backed up by the descriptive statistics seen in the graphs to the left.

DISCUSSION:

The outcomes of this study support the use, if indicated, of interim caries arresting medications, such as silver diamine fluoride, to arrest or slow caries progression during the wait period for comprehensive dental treatment under general anesthesia. The results support that with SDF application prior to the OR appointment the likelihood that the tooth was able to be restored was greater than the possibility that the tooth was extracted, which can reduce the consequences of premature tooth loss, including orthodontic problems such as crowding, ectopic eruption, tooth impaction, and malocclusion. This study, with support from many others, highlights the importance of early establishment of a dental home and caries prevention. Lastly, this study indirectly supports the need for increased hospital operating room time for dental services, which can reduce wait times, reduce premature tooth loss, and reduce dental emergencies. Further research on this population of children from the Children's Hospital of Pittsburgh Pediatric Dental Clinic could evaluate how many of these 699 children required emergency dental treatment while waiting for their procedure and what the average wait time was for their COR.

CONCLUSION:

The relationship between SDF and the extraction of teeth in the pediatric dental population is one of importance and impact. Integration of SDF treatment protocols can affect the management of dental caries in young patients, and potentially reduce the need for dental extractions. By leveraging the preventative and therapeutic benefits of SDF, dentists can preserve primary dentition and promote long-term oral health outcomes in children. Furthermore, SDF utilization aligns with principles of minimally invasive dentistry.

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