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Caries arrest effectiveness of silver diamine fluoride compared to alternative restorative technique:  
randomized clinical trial

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## **Summary of the article**

H.M. Abdellatif, A.M.Ali, S.I.Baghdady et al conducted a randomized clinical trial to compare the biannual utilization of 38% silver diamine fluoride (SDF) with alternative restorative techniques (ART) when arresting caries in primary dentition. The study was conducted over a twelve-month period and was published in *European Archives of Paediatric Dentistry* in January 2021 (<https://pubmed.ncbi.nlm.nih.gov/33387347/>).

Seventy nine children ranging from ages three–eight years old were selected from the University Pediatric Dentistry outpatient clinics with at least one primary asymptomatic tooth with active lesion on the occlusal and/or labial surface. Children were randomly assigned to SDF application or ART treatment. The lesions were examined again after six and twelve months to assess the activity of the carious lesions using the International Caries Detection and Assessment System, version two.

The authors concluded that during the biannual evaluation period, there were no significant differences in the lesion between the group who received SDF versus ART treatment. However, there was a difference in the working time for each treatment. Statistically speaking, the median time to treat lesions with ART was 14.4 minutes. Whereas SDF was 3.3 minutes. This suggests that although results were similar, using SDF might be the more favorable option when dealing with children who exhibit negative and definitely negative behavior according to Frankl's behavior rating scale, as it drastically cuts down on treatment time.

## **Article Information**

The title of the article is “Caries arrest effectiveness of silver diamine fluoride compared to alternative restorative technique: randomized clinical trial”. H.M. Abdellatif, A.M.Ali, S.I.Baghdady et al were the authors of the study. The article was published in *European Archives of Paediatric Dentistry* on January 2nd, 2021.

Link to the article is: <https://pubmed.ncbi.nlm.nih.gov/33387347/>

Based on the article, no conflict of interest was disclosed.

## **Study analysis**

### **1. Type of study**

The type of study used in this clinical trial is a randomized controlled trial which followed the CONSORT guidelines in an outpatient clinic at the University Pediatric Dentistry. There were no mentions of when it was conducted.

### **2. Study purpose**

The authors conducted this study to compare the effectiveness of 38% SDF compared to ART using a well-designed randomized clinical trial with low risk of bias due to the wide range of outcomes from available clinical studies. Prior to conducting the research, SDF is of the medical modality that is used to treat carious lesions. It is often used to arrest caries in primary teeth for uncooperative and young children. The study aims to investigate the effectiveness of biannual application of 38% SDF compared to ART.

### **3. Experimental design**

The study was conducted over the span of twelve months with bi annual assessments. The children who participated were recruited from University Pediatric Dentistry outpatient clinics. Parental consent was obtained and made aware of the staining effect of SDF. All participants have the right to withdraw from the study at any time. The study sample included seventy nine children ranging from ages three–eight years old who exhibit negative and definitely negative behavior according to Frankl’s behavior rating scale. The study was open to both genders of children as long as they had at least one primary asymptomatic tooth with carious lesions on the occlusal surfaces carious lesion in posterior teeth or labial surfaces in anterior teeth in accordance to International Caries Detection and Assessment System, version 2. The study did not include any children with systemic diseases, silver allergy, oral lesions ,

teeth with proximal or multi-surface caries or pulp involvement. Participants were taught proper oral hygiene instructions and consulted regarding dietary habits. They were instructed to brush their teeth prior to starting the clinical procedures. No decay was removed for both groups. The measures the researcher used to evaluate was a mouth mirror and CPI probe in conjunction with visual and tactile senses. Also ICDAS was assigned for each included surface.

The findings were analyzed statistically using the Chi-square analysis or a Fisher's Exact test. All of the dental examinations were performed by a single calibrated examiner. Ten percent of the sample was then re-examined by the intra-examiner. As a result, the Kappa statistic scored a 0.887, indicating that scoring criteria were consistently applied throughout the study period.

#### **4. Results**

After analyzing the results, the difference observed in both groups was the lesions' location, arch distribution as well as ICDAS score. In the SDF group, only one tooth failed at twelve months due to tooth fracture during mastication which required endodontic treatment. In the ART group, failure of four teeth occurred at six months and five teeth at the twelve months mark. These failures lead to caries progression, need for endodontic treatment, extraction and abscesses. When comparing the failure rate between the two groups, the ART group is significantly higher. There were no significant differences in caries arrest between the arches. The working time required between the two groups varied dramatically. The medium time for the SDF group was 3.3 minutes compared to the ART group which was 14.4 minutes.

#### **5. Conclusion**

The author concluded that the results of this twelve month randomized clinical trial validated the effectiveness of 38% SDF for caries arrest in primary teeth observed. The SDF effectiveness in caries arrest is most likely due to its high silver and fluoride ion concentrations.

It also has properties that help alkalize the oral cavity for communities of high sugar consumption. Their findings contributed to the knowledge of the subject by confirming the previous studies already done on SDF while trying to minimize bias by using a randomized controlled trial. The limitations for this experience was the number of children who were consented by parents or guardians which later decided to drop out. In order to address this, the entire analyses were carried out twice. Once with an intention-to-treat and a second time without an intention-to-treat. There were no major differences found in the results. Even though the groups were randomized, the children in the SDF group were significantly older than the ART group. In conclusion, SDF is superior to ART as it is minimally invasive, fast, easy and produces better results. The drawback is possible gingival staining, sensitivity and aesthetics.

## **6. My impression**

I thought the findings were relevant and helpful when considering treatment options in pediatric dentistry with special needs children or those who exhibit negative behavior towards dental procedures. It is possible to use on elderly patients as it may be difficult to sit them all the way down in the chair. The children of the lower socioeconomic class are more likely to not have access to dental care or to expect a longer wait time to get an appointment and receive treatment. SDF is relatively inexpensive and can be used in communities of lower socioeconomic class as it is more affordable and quick to use with a median time of 3.3 minutes. I think the article was interesting but based on what I learned in class already, the results were as expected that SDF was going to be a better option especially when dealing with children. SDF might not be aesthetically pleasing but it might be the best option for some patients. Some of the statistics were interesting and it can be used when educating parents when considering SDF treatment for children who may be more difficult to work or cannot sit in the chair for prolonged periods of time. This is also beneficial for the dental healthcare provider as it cuts down on working time, carrying out treatment and taking into

consideration their ergonomics when dealing with certain patients. SDF is fascinating and it is often associated with children, I would love to see studies on it for elderly patients. I know that as dentistry progresses, there will always be more to learn and it doesn't stop here.

## Sources

Abdellatif, Ali, A. M., Baghdady, S. I., & ElKateb, M. A. (2021). Caries arrest effectiveness of silver diamine fluoride compared to alternative restorative technique: randomized clinical trial.

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