Journal of Chemical Health Risks

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JCHR (2026) 16(2), 149-162 | ISSN:2251-6727

A Study to Evaluate the Effectiveness of Silver Diamine Fluoride in Arresting Dental Caries in Primary Teeth in 2-6 Year Old Children

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(Received: 05 January 2026 Revised: 15 February 2026 Accepted: 05 March 2026)

KEYWORDS

SDF, Nyvad's Caries, Dental Caries, Colour, Unarrested Lesions, Silver Diamine Fluoride

ABSTRACT:

Background: The aim of the present study was to evaluate the clinical effectiveness of silver diamine fluoride (SDF) in arresting dental caries in primary teeth in 2-6 years old children in the Out Patient Department of Pediatric and Preventive Dentistry at Bhojia Dental College and Hospital (Bhud) Baddi, Dist. Solan (H.P).India

Material and Methods: A total of 1000 carious teeth were selected from 291 patients in the age range of 2-6 years. Carious lesions with Nyvad's caries diagnostic criteria 3 were selected while Patients with reversible or irreversible pulpitis, pathological mobility, internal or external root resorption and any sinus tract present were excluded from the study. SDF was applied to all the lesions and these were considered arrested, if their consistency changed from soft or leathery to black and hard.

Results: Application of SDF after first follow up i.e. 1 week, 791 caries lesions were arrested and 150 remained unarrested. At 3 months and six months follow-up, reapplication was done on all the teeth. There were 819 (87%) arrested lesions and 122 unarrested lesions. Similar results were seen when re-evaluated at six months and SDF was reapplied.SDF turned colour of lesion into black which had aesthetic problem in anterior region. Parental acceptance of colour of SDF was recorded. Out of 274 parents, 126 (46%) parents reported color as acceptable, for 57 (21%) of the parents, it was satisfactory and 91 (33%) reported it as unacceptable.Also,26 (9%) patients had reported taste as acceptable and 248 (91%) patients reported taste as unacceptable.

Conclusion: The present study concluded that SDF can be used to arrest caries and to treat dentin sensitivity.

Introduction

Early childhood caries is a chronic disease with world wide spread. It is defined as the presence of one or more decayed (non cavitated or cavitated lesion), missing (due to caries), or filled tooth surfaces in any primary tooth in a child at 71 months of age or younger.[1-3] The factors responsible for ECC in children are diet, feeding

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JCHR (2026) 16(2), 149-162 | ISSN:2251-6727

habits, and pacifier use. Now there is more awareness among people related to dental caries and also with advancement in dentistry it is easy to intercept but still ECC remain a problem. The Nyvad classification is a visual-tactile caries classification system. It detects the caries lesion activity and severity especially focusing on low-caries population.[4] The entire caries continuum is reflected by the Nyvad classification. It includes clinically sound surfaces, microcavitated caries lesions in enamel, to frank cavitation into the dentin. In every stage of lesion severity the activity is discriminated by the differences in surface topography and lesion texture. Distinctive feature of this classification is that in addition to assessing the severity of lesions (presence or absence of cavity formation), each severity score includes an assessment of carious lesion activity. The researchers found that occasional SDF application for caries arrest done is much below than the concentration associated with toxicity.[5-9] The adverse reaction of SDF include metallic bitter taste, temporary staining of the oral mucosa which may resolve in 2-14 days. Allergic to silver is a complete contraindication to SDF. Use of potassium iodide (KI) to mask discoloration is contraindicated in pregnant women and during the first six months of breastfeeding due to concern of overloading the developing thyroid with iodide. Although some staining associated with SDF can be polished of, it may remain, especially at restorative margins. As such, patients should be aware of this and SDF should not be applied to patients where esthetic is of major concern. SDF application is simple and cost effective. It follows minimal intervention dentistry concept. In a study it was found that in primary teeth SDF showed preventive fraction of 79.7%.[26] In a study it was seen that in two groups SDF group and control group (without any intervention) children in SDF group had significantly (97%), more surfaces with inactive caries and a higher percentage of black stains when compared with the control group, which had only 48% of the inactive black lesions.[10-15] In a study done by Zhao et al the percentage of active caries that became arrested was 81%. SDF was commonly used at 38%. Santos Jr et al. compared caries-arresting properties of 30% SDF with those of GIC as an intermediate restorative technique (IRT). Their study demonstrated that SDF was 1.73 times more effective in arresting caries than IRT. SDF effectively arrest dentine caries in primary teeth among children. Since, there is lack of published on caries arrest of SDF. Hence, the present study was conducted to evaluate clinical efficacy of SDF in arresting carious lesions and the occurrence of new lesions in primary teeth.

Materials and Methods

The present study was conducted in the Department of Pediatric and Preventive Dentistry, Bhojia Dental College and Hospital Bhud, Baddi, Dist. Solan to investigate the short-term effectiveness of topically applied 38% silver diamine fluoride (SDF) in arresting carious lesions in primary teeth. A Total of 1000 carious primary teeth (Nyvad's caries diagnostic criteria 3) were selected from the patients visiting the Department on the regular Outpatient basis. The oral health examination of the children was done and parental consent of the selected children was obtained after explaining the nature of the study (Annexure 1). The Study was approved by Institutional Ethical Committee Bhojia Dental College and Hospital (BDC/BUDH/SF/790).

Inclusion Criteria: The Children with following Criteria were included: Age range of 2-6 years, Primary or mixed dentition, Uncooperative behavior, Enamel or enamel and dentine caries only, Weight>15 kg. **Exclusion Criteria:** The Children with following criteria were excluded: Carious teeth involving pulpal tissue, Swelling and fistulae, Perioral stomatitis and ulceration, Known allergy to silver or heavy metal ions, Esthetics is a concern for the patient or parents.

Once the child fulfilled the inclusion criteria, he/she was treated in the Department of Pediatric and Preventive Dentistry for the remaining treatment. Detailed history of the child was taken to exclude any condition which could affect or compromise his/her health. Armamentarium used in the study for clinical examination**:** Kidney tray, Blunt Probe, Mouth mirror, Tweezer, Explorer. For application of SDF: 38% SDF (FAgamin Tedequin S.R.L Argentina), Micro brush, Plastic Dappen dish, Plastic tray, Petroleum jelly, Cotton rolls/cotton pellets/gauze pieces, Suction tip.

Methods

A thorough medical and dental history was taken (Annexure 2). The examination was done with a plane mouth mirror and probe. Gingiva was checked for any

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redness, gingival ulceration and stomatitis. The selected patients had at least one untreated cavitated active carious lesion involving enamel or enamel and dentin. There was no radiographic parameter in the study. The lesions were examined with naked eye, plane mirror and blunt probe. Biofilm was removed from the tooth surface using the side of a sharp explorer while tip of the explorer gently runs across lesion to asses surface roughness. The explorer was used carefully to avoid damage to surface layer of the lesion. The primary teeth with active carious lesions (Nyvad's criteria 3) were selected. Nyvad classification is a visual-tactile caries classification system. It detects the activity and severity of carious lesions. Nyvad's caries diagnostic criteria to be used in this study are as follows**.**

Table 1: Description of the Nyvad criteria for caries lesion activity and severity assessment [Nyvad et al., 1999]

Score	Category	Criteria
0	Sound	Normal enamel translucency and texture (slight staining allowed in otherwise sound fissure)
1	Active caries (intact surface)	Surface of enamel is whitish/yellowish opaque with loss of luster; feels rough when the tip of the probe is moved gently across the surface; generally covered with plaque. No clinically detectable loss of substance smooth surface, caries lesion typically located close to gingival margin. Fissure/pit: intact fissure morphology; lesion extending along the walls of the fissure.
2	Active caries (surface discontinuity)	Same criteria as score 1 Localized surface defect (microcavity) in enamel only. No undermined enamel or softened floor detectable with the explorer.
3	Active caries (cavity)	Enamel/dentin cavity easily visible with the naked eye; surface of cavity feels soft or leathery on gentle probing. There may or may not be pulpal involvement.
4	Inactive caries (intact surface)	Surface of enamel is whitish, brownish or black Enamel may be shiny and feels hard and smooth when the tip of the probe is moved gently across the surface. No clinically detectable loss of substance. Smooth surface: caries lesion typically located at some distance from gingival margin. Fissure/pit: intact fissure morphology; lesion extending along the walls of the fissure.
5	Inactive caries (surface discontinuity)	Same criteria as score 4 Localized surface defect (microcavity) in enamel only. No undermined enamel or softened floor detectable with the explorer.
6	Inactive caries (cavity)	Enamel/dentin cavity easily visible with the naked eye; surface of cavity may be shiny and feels hard on probing with gentle pressure. No pulpal involvement.
7	Filling (sound surface)	-
8	Filling + active caries (noncavitated)	Caries lesion may be cavitated or noncavitated.
9	Filling + inactive caries	Caries lesion may be cavitated or noncavitated.

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Clinical Procedure

Before initiating the clinical procedure, consent of the patient's parents was obtained in a written format. The lesion activity was detected by surface topography and texture of the lesions. on gentle probing with the tip of a explorer.

- An actively progressing lesion in enamel is matte and rough
- An active dentin caries lesion appears soft, shiny and smooth
- Rough surfaces of active non-cavitated enamel lesion appear lusterless due to scattering of light
- An inactive lesion appears hard
- Inactive lesion appears shiny because of specular reflection.

Complete oral prophylaxis of all the patients was done. A protective coating of petroleum jelly was applied on the lip and skin and gingival tissue of the patient to prevent a temporary tattooing of soft tissue and skin. Carious lesions were not excavated. Isolation of the affected area was done with cotton rolls as the Nyvad criteria require clean and dry teeth. Care was taken not to inadvertently coat the surface of carious lesion. Carious lesions were dried with compressed air and 38% SDF (FAgamine) was applied with microbrush. Microbrush was bent and dipped into the SDF liquid in the plastic dapen dish. The brush was dabbed on the side of plastic dapen dish to remove excess liquid before the application. SDF was applied for minimum of 1 minute and dried with gentle blow of air. Extra SDF was removed with gauze piece to reduce systemic absorption of silver. Following this the lesion was isolated for 3 minute. One drop per appointment was applied (AAPD Guidelines). Parental acceptability of SDF treatment was recorded at each appointment and scored as unacceptable, satisfactory and acceptable; additionally acceptance of taste was also evaluated at each application visit and scored as unacceptable and acceptable. Adverse events like discoloration of the skin of face, gingiva and mucous membrane were also noted. No rinse was performed and patients were instructed not to eat or drink for 1 hour. Follow up was done at one week, three months and six months interval following initial treatment and teeth were evaluated for arrest of treated carious lesion additionally at one week follow up SDF was reapplied only on those lesions which were unarrested. At 3 months and 6 month follow up SDF was applied to all the lesions. Colour and texture of lesions were evaluated based on clinical outcomes, Dark, hard and black lesions with no pain or infection were considered positive outcome. Lesions were examined after one week to check for arrest of the caries, if not arrested, reapplication of SDF was done. In case, cooperation of the child was not achieved leading to remaining active carious lesions SDF was applied in the following visit. The carious lesion was considered as arrested, if it had moved from Nyvad's criteria 3 to 6. The data thus obtained was subjected to statistical analysis.

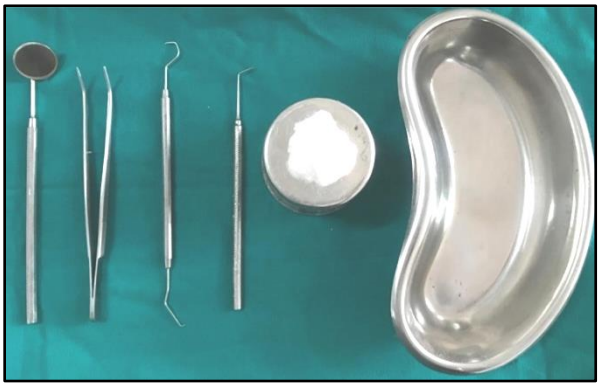

Fig 1: Armamentarium used for diagnosis

Fig 2: Armamentarium for application of SDF

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Fig 3.1 Pre-operative 51 52 61 62

Fig 3.2 Post-operative 51 52 61 62

Fig 3.3 Three months follow-up

Fig 3.4 Six monthsfollow-up

Fig 4.1 Pre-operative 85

Fig 4.2 Post operative 85

Fig 4.3 Follow-up at 3 months

Fig 4.4Follow-up at 6 months

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Fig 5.1 Pre-operative 51 52 61 62

Fig 5.2 Post-operative 51 52 61 62

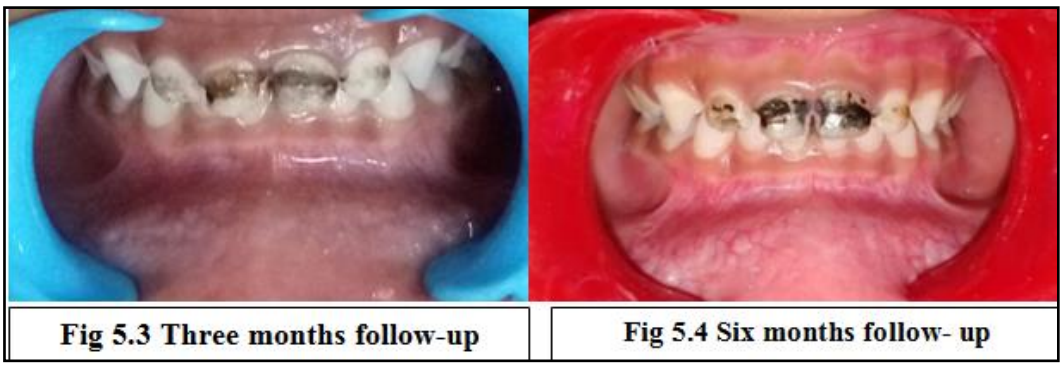

Fig 5.3 Three months follow-up

Fig 5.4 Six months follow- up

Fig 6.1 Pre operative 51 52 61

Fig 6.2 Post-operative 51 52 61

Fig 6.3 Three months follow-up

Fig 6.4 Six months follow-up

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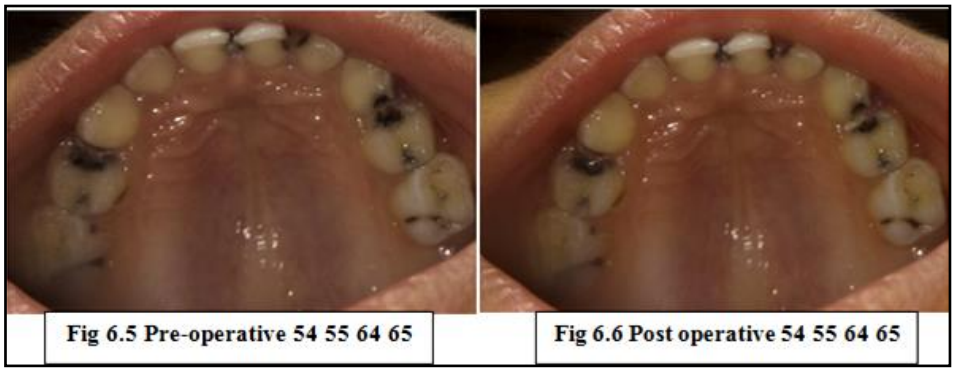

Fig 6.5 Pre-operative 54 55 64 65

Fig 6.6 Post operative 54 55 64 65

Fig 6.7 Three months follow up

Fig 6.8 Six month follow up

Fig 6.9 Pre-operative 74 75 84 85

Fig 6.10 Post-operative 74 75 84 85

Fig 6.11 Three months follow-up

Fig 6.12 Six month follow-up

Statistical Analysis

In this research, we employed SPSS software version 29.0 to conduct a series of comprehensive statistical analyses, allowing us to interpret and evaluate our data effectively. To assess the significance of our findings, we applied the chi-square test, which effectively compares proportions across groups. This method provided a thorough examination of categorical data, ensuring our results accurately reflect the underlying trends in the dataset

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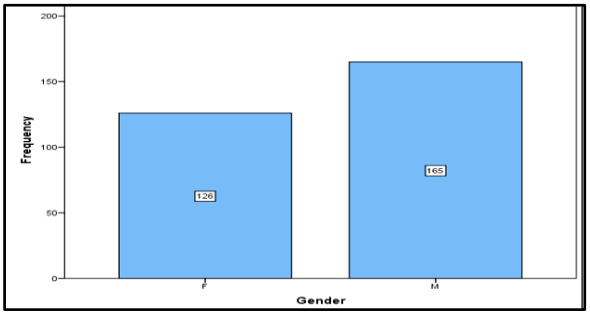
Results

Table 1: Age and Gender Wise Distribution of Sample

Total	Gender		Age		Mean	SD
	Male	Female	Minimum	Maximum		
291	165 (56.7%)	126 (43.3%	2 Years	6 years	4.2	1.1

The sample consisted of 1000 carious primary teeth with active carious lesions. The sample was selected out of 291 healthy children visiting Out Patient Department of Paediatric And Preventive Dentistry. Seventeen children (12 male and 5 female) having 59 carious teeth have not reported for the follow-up. Therefore, the final sample must consist of 274 children with 941 carious teeth. Out of 291 children there were 165 (56.7%) males and 121 (43.3%) females. They were in the age range of 2-6 years with mean age of 4.2±1.1 year.



Bar Diagram 1: Distribution of Sample According to Gender

Table 2.1: Distribution of Sample According to Consistency of Dental Caries in Maxillary Anterior Teeth

Tooth No	Total	Soft	Leathery
51	120	105(10.5%)	15(1.5%)
52	72	39(3.9%)	33(3.3%)
53	22	11(1.1%)	11(1.1%)
61	94	65(6.5%)	29(2.9%)
62	55	38(3.8%)	17(1.7%)
63	16	7(0.7%)	9(0.9%)
Total	**379**	**265**	**114**

A total of 1000 carious Primary teeth were selected as per NYVAD criteria 3. These teeth were further categorized according to the consistency of carious lesions i.e. soft or leathery. The sample was further divided into 4 quadrants i.e. Maxillary Anterior Teeth, Maxillary Posterior Teeth, Mandibular Anterior Teeth and Mandibular Posterior Teeth. So Maxillary Anterior region had total 379 carious teeth. Out of which 265 lesions were soft and 114 were leathery. Further tooth-wise distribution showed 120 Maxillary Right Central Incisors (51) out of which 105 (10.5%) had soft and 15 (1.5%) had leathery consistency. There were 72 Maxillary Right Lateral Incisor (52), Out of which 39 (3.9%) teeth had soft and 33 (3.3%) had leathery consistency. There were 22 Maxillary Right Canine (53), Out of which 11(1.1%) had soft and 11 (1.1%) had leathery consistency. Out of 94 Maxillary Left Central Incisor (61), 65(6.5%) were soft and 29(2.9%) were leathery in consistency and Out of 55 Maxillary Left Lateral Incisor (62), 38 (3.8%) were soft in consistency and 17 (1.7%) were leathery in consistency. Out of 16 maxillary left canine 7 (0.7%) were soft and 9 (0.9%) were leathery in consistency.

Table 2.2: Distribution of Sample According to Consistency of Dental Caries in Maxillary Posterior Teeth

Tooth No	Total	Soft	Leathery
54	83	69(6.9%)	14(1.4%)
55	56	42(4.2%)	14(1.4%)
64	78	61(6.1%)	17(1.7%)
65	67	27(2.7%)	40(4%)
Total	**284**	**199**	**85**

Similarly maxillary posterior region had 284 carious lesions. Out of which 199 (19.9%) lesion were soft and 85 (8.5%) were leathery in consistency. Tooth wise distribution showed that out of 199 (19.9%) soft lesion 69 (6.9%) were Maxillary Right First Molar (54), 42 (4.2%) were Maxillary Right Second Molar (55), 61 (6.1%) were Maxillary Left First Molar (64) and 27

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(2.7%) were Maxillary Left Second Molar (65). Out of 85 (8.5%) leathery lesion 14 (1.4%) were Maxillary Right First Molar (54), 14 (1.4%) were Maxillary Right Second Molar (55), 17 (1.7%) were Maxillary Left First Molar (64) and 40 (4%) were Maxillary Left Second Molar (65).

Table 2.3: Distribution of Sample According to Consistency of Dental Caries in Mandibular Anterior Region

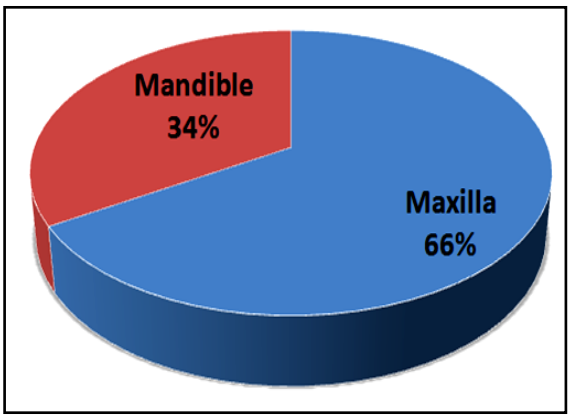
Tooth No	Total	Soft	Leathery
71	6	2(0.2%)	4(0.4%)
72	5	3(0.3%)	2(0.2%)
73	15	10(1%)	5(0.5%)
81	3	2(0.2%)	1(0.1%)
82	6	3(0.3%)	3(0.3%)
83	10	4(0.4%)	6(0.6%)
Total	**45**	**24**	**21**

Similarly Mandibular anterior region had 45 carious teeth. Out of which 24 carious lesions were soft, and 21 were leathery in consistency. Tooth wise distribution of carious lesion showed out of 45 soft lesions 2 (0.2%) were Mandibular Left Central Incisor (71), 3 (0.3%) were Mandibular Left Lateral Incisor (72) and 10 (0.1%) were Mandibular Left Canine (73). Out of 21 leathery lesion 4(0.4%) were Mandibular Left Central Incisor (71), 2(0.2%) were Mandibular Left Lateral Incisor (72), 5(0.5%) were Mandibular Left Canine (73), 1(0.1%) were Mandibular Right Central Incisor (81), 3(0.3%) were Mandibular Right Lateral Incisor (82) and 6(0.6%) were Mandibular Right Canine (83).

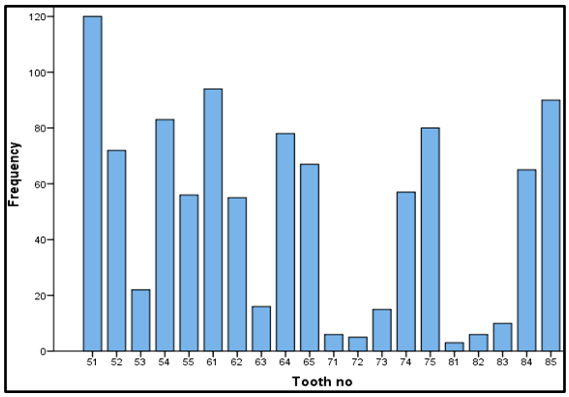
Table 2.4: Distribution of Sample According to Consistency of Dental Caries in Mandibular Posterior Region

Tooth No	Soft	Leathery	Total
74	46(4.6%)	11(1.1%)	57
75	50(5%)	30(3%)	80
84	40(4%)	25(2.5%)	65
85	55(5.5%)	35(3.5%)	90
Total	**191**	**101**	**292**

Similarly mandibular posterior region had 292 carious lesions. Out 191 soft lesions, 46 (4.6%) carious lesions were Mandibular Left First Molar (74), 50 (5%) were Mandibular Left Second Molar (75), 40(4%) were Mandibular Right First Molar (84) and 55(5.5%) were Mandibular Right Second Molar (85). Out of 101 leathery lesions 11(1.1%) were Mandibular Left First Molar (74), 30(3%) were Mandibular Left Second Molar (75), 25(2.5%) were Mandibular Right First Molar (84) and 35(3.5%) were Mandibular Right Second Molar (85).



Pie Chart 2: Jaw wise distribution of Sample



Bar Diagram 3: Tooth wise distribution of sample

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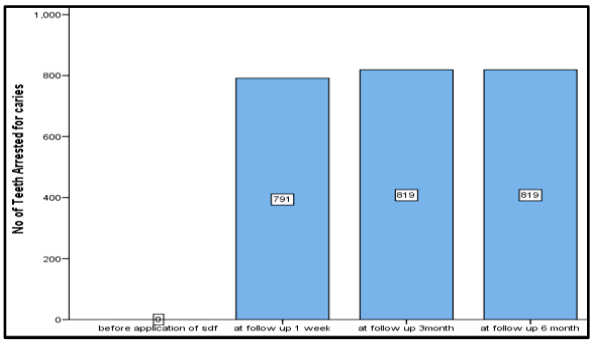
Table 3: Effectiveness of SDF in Arresting Carious Lesion

Total No of active carious lesion N = 941	Follow up at 1 week		Follow up at 3 month		Follow up at six month		P value
	Arrested	Unarrested	Arrested	Unarrested	Arrested	Unarrested	0.000
	791	150	819	122	819	122	

As per the main objective of our study, the arrest of the lesions after application of SDF was checked. Initially out of 291 patients with carious 1000 primary teeth, 17 patients with 59 carious teeth didn't come for follow up visit and were excluded from the study. Thus reducing the total number of patients to 274 with 941 teeth having active carious lesions. SDF was then applied on these carious teeth and reapplication along with follow up was done at 1 week, 3 month and 6 month time. It was seen that on first follow up visit 791 carious lesions out of 941 got arrested and 150 are still unarrested carious lesions. On second follow up visit at 3 month interval, 819 lesions got arrested and only 122 lesions remained unarrested and same was seen at 6 months interval. The result had p value of 0.000 which is statistically highly significant (as shown in the table and figure).



Bar Diagram 4: Effectiveness of Sdf in Arresting Carious Lesion

Table 4: Evaluation of Parental acceptance of colour of Silver Diamine Fluoride

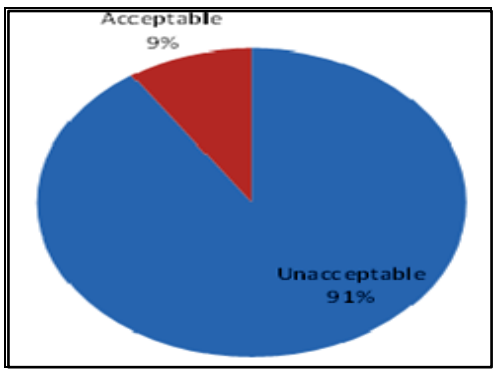
Parental acceptance of colour (n=274)	Frequency/Percentage (%)
Acceptable	126 (46%)
Satisfactory	57 (21%)
Unacceptable	91 (33%)

The parental acceptance of colour of teeth after SDF application was also studied. It was seen that out of 274 parents who reported with their children on first follow up at 1 week interval, 126 (46%) parents found the colour acceptable. Fifty seven i.e. 21% found the colour satisfactory and 91 i.e. 33% found the colour of teeth unacceptable.

Table 5: Acceptability of Taste of Silver Diamine Fluoride

Taste acceptance by the child (N=291)	Frequency/Percentage (%)
Acceptable	26 (9%)
Unacceptable	265(91%)

In this study, we also had evaluated the acceptability of taste of SDF by the child. It was seen that out of 291 children only 26 i.e. 9% children found the taste acceptable and rest 265 children (91%) found it unacceptable.



Pie Chart 5: Evaluation of taste of SDF

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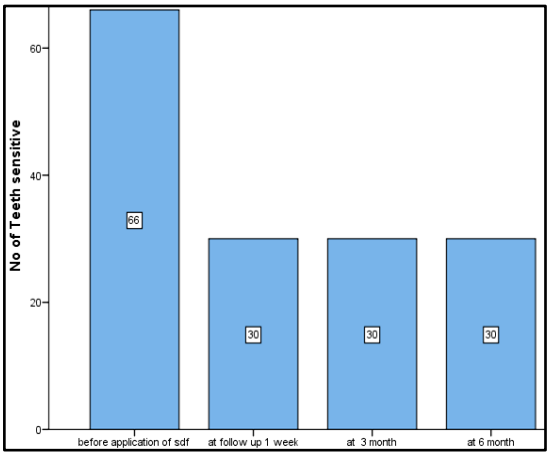

Bar Diagram 6: Total no of Teeth having Sensitivity before and after application of Sdf

Discussion

The present study was conducted in 2-6 years old children with the aim to evaluate the clinical effectiveness of SDF in arresting dental caries in the primary teeth in the Out Patient Department of Pediatric and Preventive Dentistry at Bhojia Dental College and Hospital. Patients with carious lesions involving enamel and dentin only were included in the study. Patients with reversible or irreversible pulpitis, pathological mobility, internal or external root resorption and any sinus tract present were excluded from the study. A total of 1000 carious teeth were selected from 291 patients and SDF was applied to all the teeth. Out of 291 patients, 17 patients having 59 teeth didn't reported for the follow-up and they were excluded from study. Therefore, 274 patients with 941 teeth were followed up for 6 months. The sample size was decided after discussion with statistician. Age range of 2-6 years was taken to include the primary dentition only and children generally have lack of co-operative ability till 2-3 years of age. The only solution to these children is General Anesthesia which has again accessibility issues and long term consequences. In 5-6 years old children SDF is also helpful in maintaining carious primary teeth in arch which are near exfoliation. Weight criteria was kept more than 15 kg as to keep the applied dose in the range of the minimum risk dose for chronic exposure to silver as determined by the U.S.[16-20] Centers for Disease Control and Prevention. Dental caries is a multifactorial disease with varying clinical picture. In its initial stage it is preventable and can be arrested. Carious lesion progression is a dynamic process showing alternating periods of dissolution and redeposition of minerals in dental hard tissues as explained by Larsen and Bruun, 1994; Fejerskov and Clarkson, 1996.[21-28] When demineralization predominates it result in a net loss of minerals and a carious lesion develops, or progress as stated by Fejerskov and Manji in 1990 and Fejerskov in 1997. When mineral redeposition predominates, it may result in arrest of lesion progression as explained by Nyvad and Fejerskov (1997). To intercept it at its initial stage, early diagnosis and monitoring is mandatory. Therefore, a reversal can take place, if it is intercepted at initial stage. If the lesion is cavitated or it crossed the stage of remineralization, its arrest or converting it into inactive lesion is the choice still left. The characteristic feature of the initial lesion is that it is covered with bacterial plaque and rough on clinical examination. Nyvad stated that active caries is soft and leathery and a change in color whitish to light brown.[29-35] The Nyvad criteria is therefore designed to reproduce all the carious lesion transitions that may occur in a patient over time, either naturally or in response to caries control measures. A limitation of Nyvad´s diagnostic system is that it is more difficult to make an exact diagnosis of a precavitated active lesion such as a white spot lesion over the occlusal surface than over the facial surface. These lesions can be under diagnosed, progressing to frank cavitation. On the other hand, because of the physiologic wear of the occlusal surface during mastication, these lesions can disappear. In the present study, carious teeth were evaluated based on the Nyvad criteria and were assessed depending on their surface texture and topography under dental light with blunt probe and mouth mirror.[36-40] Teeth were properly dried before assessing the lesion. Carious lesion showing characteristic features of Nyvad criteria 3 were selected. Nyvad criteria 3 is active caries (cavity) enamel/dentin cavity easily visible with the naked eye; surface of cavity feels soft or leathery on gentle probing. Leathery lesions when penetrated by a probe under modest pressure displayed resistance to its withdrawal, while soft lesions are easily penetrated under modest pressure and displayed no resistance to withdrawal of the probe. SDF is a colorless solution and is used in dentistry to promote remineralisation of tooth mineral hydroxyapatite that is under constant acid challenge in the oral cavity. It is effective in arresting caries and

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decreases the incidence of new carious lesions. Food and Drug Administration (FDA) in 2014, cleared the use of SDF as an agent to treat tooth hypersensitivity and, in an off- label indication, for caries arrest and management. SDF was approved in Feb 2017 in Canada at a concentration of 38% for prevention and arrest of carious lesion in both primary and permanent teeth.SDF had been used off-label for caries arrest; however, it was recently approved (code D1354) as interim caries arresting medicament. Maximum limit recommended for SDF is one drop per 10 kg of body weight per treatment visit at weekly intervals. SDF is contraindicated in patients with allergy to silver and this solution can stain clothes and skin.[41-43] The distribution of sample was noted and only primary teeth were selected. Table 2.1 shows the tooth-wise consistency of the carious lesions in maxillary anterior region. There were total 379 carious teeth. Out of 379 lesions, 265 were soft and 114 were leathery in consistency. Table 2.2 shows tooth-wise consistency of the carious lesions in maxillary posterior region. There were total 284 carious lesions. Out of 284 lesions, 199 lesions were soft and 85 were leathery in consistency. Table 2.3 shows tooth-wise consistency of the carious lesion in mandibular anterior region. There were total 45 carious lesions. Out of 45 lesions, 24 were soft and 21 were leathery in consistency. Table 2.4 shows tooth-wise consistency of the carious lesion in mandibular posterior region. There were total 292 carious lesions. Out of 292 lesions, 191 were soft and 101 were leathery in consistency. In the present study, SDF was applied at all active lesions and after 1 week, consistency of lesions was checked if not arrested then reapplication was done. Follow up was done at 3 months and 6 months. SDF was applied at 3 months and 6 months interval. Lesions were considered arrested if it turned black, hard and inactive. Table 3 shows that SDF was applied to all active caries lesions. After 1st application lesion was assessed, patient was recalled after one week to check the arrest of lesion. Out of 941 carious lesions, 791 were arrested and 150 were unarrested. Those which were unarrested, SDF were reapplied. Again the teeth were re-evaluated at 3 months and reapplication was done on all the teeth. There were 819 arrested lesions and 122 unarrested lesions. Similar results were seen when re-evaluated at six month and SDF was reapplied. It showed caries arrest rate of 84% at 1 week. Caries arrest rate of 87%was seen at 3 months and 6 months follow up. No systemic effects of SDF have been seen. Oral absorption of SDF includes absorption in mucous membranes in the mouth and the nasal cavity. The short-term health effects in humans as a result of exposure to water or food containing specific levels of silver are unknown. The Environmental Protection Agency (EPA) suggests levels of silver in drinking water not to exceed 1.142 mg/L (1.42 ppm). It can create a temporary henna-appearing tattoo if allowed to come in contact with skin. Skin pigmentation is temporary since the silver does not penetrate the dermis. Desquamation of the skin with pigmentation occurs when keratinocytes are shed over a period of 14 days. In the present study, hypersensitivity reaction was seen in one patient who reported redness after SDF application which resolved itself with in 24hours.

Conclusion

Within the limitations of the study authors concluded that the dental caries is a progressive disease if not intervened at early stage will lead to cavitation. The treatment paradigm is shifting to remineralising the carious lesions rather than the conventional surgical procedure. Fluorides have been used in topical forms to reduce prevalence of caries. SDF is a colorless solution containing 24.4-28.8% (253, 870 ppm) volume of silver, 5.0-5.9% fluoride (44,800 ppm), and ammonia. SDF is used as an agent to treat caries and hypersensitivity. It leads to remineralization of active caries. The present study demonstrated the efficacy of SDF in treating caries and dentin hypersensitivity and evaluated the esthetics concerns of parents and acceptance of taste by children. In the present study it was also noticed that SDF had a caries arrest rate of 87% at six months follow-up. Its color is accepted by parents but it's taste is not well accepted by patients.

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