

Silver Diamine Fluoride in Reducing Dentin Hypersensitivity In Vital Tooth Preparation: A Case Report

Case Report

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Abstract

Silver diamine fluoride (SDF) is a therapeutic agent which contains antibacterial and remineralizing effects. The SDF is extensively used in the management of dental caries in children and adults. SDF can be used to prevent dental caries, arrest the dental carious lesions, and potentially impact dentin hypersensitivity. Dentin hypersensitivity is one of the significant challenges in vital tooth preparations. It is imperative to manage the dentin hypersensitivity in those patients planned for vital tooth preparations. Therefore the purpose of the present case report was to describe the use of SDF in a patient who has undergone vital preparation to reduce dentin hypersensitivity.

Keywords: Silver Diamine Fluoride; Dentin Hypersensitivity; Vital Tooth; Tooth Preparation.

Introduction

Silver diamine fluoride (SDF) is a clear solution that has many advantages in dentistry. SDF is a liquid agent of a pH-10, 24.4% to 28.8% of silver and 5.0 to 5.9% of fluoride [1]. Originally SDF has introduced a century ago in dentistry. There is sufficient evidence that reported SDF is a caries arrest and preventive agent. SDF application is a non-invasive technique that is very simple to use and quick in the process. It is a safe, painless alternative to traditional cavity drilling procedures [2]. Silver ions in SDF work as antimicrobial agents, while fluoride helps form fluorohydroxyapatite and ammonia, stabilizing the components in SDF solution [1, 3]. Application of SDF penetrates to hard tissues of the tooth and forms the 2 to 3 fluoride sub-surfaces on the tooth compared to other fluoride applications used in dentistry [2, 3]. SDF-applied tooth acts as a fluoride reservoir, and it increases the duration of effectiveness. SDF reacts with hydroxyapatite crystals and forms fluorapatite, avoiding further invasion of bacteria into the tooth structures [4]. SDF works as caries arresting and preventive agent and also a good desensitizing agent [1, 4].

Short-term pain ascending from the affected dentin in response to touch, cold, hot, chemical stimulus and it is also known as sen-

sitive teeth is called as dentin hypersensitivity [5]. Dentinal hypersensitivity may be instigated by various reasons like professional oral hygiene, vital tooth preparations, dental bleaching, trauma, acidic beverages and foods, periodontal pathologies, and improper brushing techniques [6]. Dentin hypersensitivity disturbs daily habits such as drinking, eating, and sometimes breathing. It has been reported that the prevalence of dentin hypersensitivity was from 25% to 40% and more common in males [7].

Desensitizing agents are frequently used to reduce dentin hypersensitivity and especially in vital tooth preparations [8]. The desensitizing agents such as silver diamine fluoride, topical fluoride, lasers, and fluorides contain silver ions extensively used in dentistry. Desensitizing agents to minimize dentin hypersensitivity could be home-based or dental operatory-based [9] (Figure 1). The SDF is also very extensively used for dentine hypersensitivity. Castillo et al. [10] reported that topical application of SDF efficiently minimizes teeth pain from one day to one week. The mechanism behind the use of SDF application in vital tooth preparation not been studied frequently. Hence the purpose of the present report was to explain the use of SDF in vital tooth preparations to reduce dentin hypersensitivity.

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Figure 1. The treatment options available for dentin hypersensitivity.

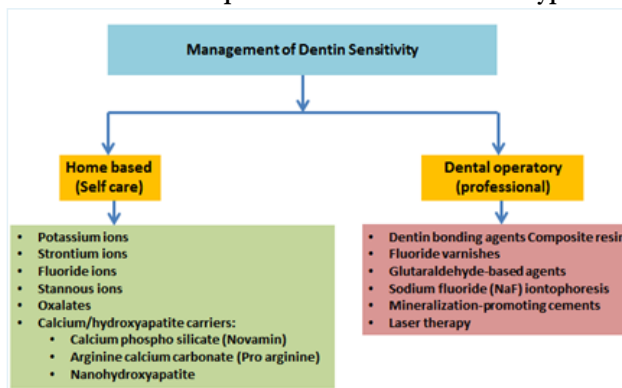


Figure 2. Intraoral clinical picture showing missing teeth.



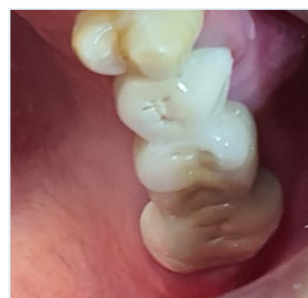
Figure 4. Intraoral clinical picture showing silver diamine fluoride applied prepared teeth 15 and 18.



Figure 3. Use an micro brush applicator brush to apply silver diamine fluoride (Fagamin) on the tooth surface.



Figure 5. Intraoral clinical picture showing fixed prosthesis.



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A 38-year-old male attended a specialty consultation clinic for the replacement of missing teeth. His dental history revealed he had undergone multiple extractions due to carious lesions. He is a diabetic patient, and otherwise, his medical history is not remarkable. His oral hygiene was inadequate. The clinical and radiographic examination revealed multi-missing teeth in the maxillary arch. The treatment options include removable partial dentures, fixed partial dentures, and implant-supported dentures were advised. Upon discussion with the patient, it was decided to plan a fixed prosthesis. At the first visit, oral hygiene instructions were given. 16 and 17 were missing in the first quadrant teeth, and mesially tilted tooth 18 was observed (Figure.2). The fixed prosthesis was planned upon discussing with the multidisciplinary specialty clinic. Tooth 15 and tooth 18 were prepared under local anesthesia, considering and planned for fixed prosthesis. After cleaning the teeth with cotton rolls, protect face skin, gums, and cheeks with cotton rolls, and dry affected teeth; SDF (Fagamin Silver Diamine Fluoride 38% SDF) was directly applied with a bent applicator tip (Figure 3) onto the affected teeth surface for 3 minutes. The excess was removed with cotton or micro brush applicator tips and then rinsed with water. The protocol followed for the placement of SDF for vital tooth preparation was summarised in Table 1.

Since it is vital tooth to avoid dentin hypersensitivity, SDF was applied (Figure 4) followed by temporized acrylic crowns. Upon one follow visit fixed partial prosthesis was given (Figure 5).

Discussion

Various mechanisms had have been proposed for dentinal hypersensitivity in the published literature. These include Brannstrom’s fluid hydrodynamic theory [11] and odontoblast receptors [12], and direct innervation theory [13]. These dentinal tubules consisting of dentinal fluids extend through the entire dentine thickness from pulp to dentinoenamel junction. Tooth preparation is the essential and foremost step in prosthetic rehabilitation. It is irreversible calculated removal of tooth structure to inculcate the structural durability of the prosthesis. One of the significant disadvantages of vital tooth preparation is dentinal hypersensitivity [14]. Dentinal hypersensitivity is the most common clinical condition arising from vital tooth preparation associated with exposed dentinal surfaces. Diminutive shooting pain originates from unprotected dentin in response to stimulus like tactile, thermal, chemical or osmotic that is not associated with dental defect or pathology [7, 8]. Dentinal hypersensitivity is high in females than in males and affects any age group but most commonly affected patients age group of 20-50 years with the peak between 30-40

Table 1. Recommended Protocol for application of Silver diamine fluoride in vital tooth preparations.

Step	Procedure
Step 1	Local anesthesia administration
Step 2	Tooth preparation
Step 3	Tooth selection (vital Tooth)
Step 4	Isolation of selected tooth with any isolation methods
Step 5	Dry the tooth with cotton or tooth brush
Step 6	Dispense the Silver diamine fluoride liquid into dappen dish
Step 7	Application of Silver diamine fluoride
Step 8	<ul style="list-style-type: none"> · Bend the applicator tip (Figure 2) · Dip the brush into silver diamine fluoride and dab onto the side of the plastic dappen dish to remove excess liquid before application onto the teeth prepared. · Apply silver diamine fluoride directly to the affected tooth surface only. · Remove the excess SDF with gauze, cotton roll, or cotton pellet to minimize systemic absorption. Wait till discoloration (3 minutes)
Step 9	Temporary crowns placement
Step 10	Fixed prosthesis

years [11].

Dentinal tubules are exposed during tooth preparation and cause hypersensitivity in [14]. This hypersensitivity can be treated by many desensitizing agents [9]. Among these, SDF is also an excellent agent that could give quick relief. The use of CO2 laser and SDF has also been reported to be very effective in minimizing dentin hypersensitivity in the case of vital tooth preparations [11]. SDF application is one best aid to reduce hypersensitivity in vital tooth preparation [15]. There is sufficient evidence to establish the SDF mechanism in blocking dentinal tubules [16-18]. Nonetheless, in vital tooth preparations, SDF can reduce dentin hypersensitivity by blocking the exposed dentinal tubules. It has been reported that dentin hypersensitivity is one of the most common problems encountered in patients with vital tooth preparations [10, 14, 17]. In the present case, SDF was applied to avoid dentin hypersensitivity at the same visit of crown preparation. This case serves as one of the best examples to explain the application of SDF on vital crown preparations.

Conflict Of Interest

The Author have no conflicts of interests to declare.

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Conclusion

Silver diamine fluoride is the feasible agent to reduce dentin hypersensitivity in vital tooth preparations. The application SDF could be done at the same time as vital tooth preparations.

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