The Republic of Iraq

Ministry of Higher Education and Scientific Research

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Silver Diamine Fluoride In Dentistry

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2024 A.D. **1445 A.H.**

بسم الله الرحمن الرحيم

(وَمَا أُوتِيتُمْ مِنْ الْعِلْمِ إِلَّا قَلِيلا)

صدق الله العليّ العظيم

(سورة الاسراء الآية٨٥)

شكر وتقدير

اول من يُشكر و يُحمد اناء الليل و اطراف النهار هو الوهاب الذي اغرقنا بنعمه التي لا تُحصى وأغدق علينا برزقه الذي لا يفنى وأنار دروبنا وعلمنا ما لم نكن نعلم وحثنا على طلب العلم اينما وجد ووفقنا وألهمنا الصبر على المشاق لانجاز هذا العمل المتواضع فله جزيل الحمد والثناء العظيم

والشكر موصول الى كل معلم افادنا بعلمه منذ اولى المراحل الدراسية حتى هذه اللحظة.

كما نرفع كلمة الشكر الى الدكتور المساعد (حسن فليح الوطيفي) والدكتور المساعد (احمد محمد عباس) مشرفا البحث.

وأخيرا نشكر من ساندنا بالصلاة والدعاء وسهر الليالي لأجلنا وشاركنا لحظات الحزن والفرح وعلمنا ان الدنيا ساحة كفاح سلاحها العلم والمعرفة وكل من مد لنا يد العون من قريب او بعيد .

لا يسعنا ألا ان ندعو الله عز و جل ان يُحسن الى كل من احسن الينا.

إهداء

الى أبي العطوف.... قدوتي، ومثلي الأعلى في الحياة؛ فهو من علَّمني كيف أعيش بكرامة وشموخ.

إلى أمي الحنونة..... لا أجد كلمات يمكن أن تمنحها حقها، فهي ملحمة الحب وفرحة ألعمر ومثال التفاني والعطاء.

إلى إخوتي.... سندي وعضدي ومشاطري أفراحي وأحزاني.

إلى جميع الأخلاء؛ أهدي إليكم بحثي العلمي في

Silver Diamine Fluoride In Dentistry

Introduction

Teeth loss from an early age has emerged as one of the most common oral diseases in children and adults. Dental caries is a bacterial process, usually a disease, site, multifactorial, a dynamic disease process caused by an imbalance of the balance between tooth water and plaque fluid; which means that, when the pH decreases, it results in mineral loss over time.

Tooth caries regarded as the most common diseases that affect children around the world. International data on caries epidemiology confirms that tooth decay remains an important childhood disease found in developing and developed countries. The development of caries in the enamel and dentine is different. Enamel caries refers to the destruction of mineral-rich tissue due to bacterial acid attack, and that in dentine includes both minerals and the matrix damage of the collagen fiber network.2However, the treatment of dental caries can be a challenge that requires advanced medical expertise and high cost of equipment and good patient cooperation. When tooth decay is found in very young children, and because of their limited ability to cope, it can be confusing for a doctor to remove all caries and restore the tooth structure properly. Proper dental treatment for untreated children is disadvantage in many communities.

The fluoridated agent of silver diamine fluoride's (SDF) has been suggested to have the ability to halt the caries process at the same

time prevent the formation of new lesions. After its first use in Japan, the (SDF) in the late 1960s and 1970s disappeared and was not widely reported in other parts of the world. However, in the early 21st century, its use began again, in China as caries binding agent in school children. K Knight et al. 2005 to 2009 in Australia conducted a sequence of in vitro studies and proved its effect as binding caries and antimicrobial agent. In 2009 Braga et al. in the US and Yee et al. in Nepal the SDF has been used as caries binding agent successfully. However, there are many ongoing studies in different parts of the world about the various clinical outcomes of the SDF.

mechanism of action

1. First goal for caries to attack is dentinal tubules. SDF-treated Dentin reduced dye availability and increased electrical resistance. Consequently, silver and its components were present in the dental tubules. Therefore, the spread of acid and the invasion of microorganisms through the dental tubules can be prevented. Even if microorganisms attack the dental tubules, their growth will be inhibited by oligodynamic silver action. Due to the presence of dental bone, the surface area of the dentin, which is not affected by caries will decrease, and the peritubular area, the easily pulled part of the dentin can be covered with acquired material (silver particles). These factors

in conjunction with the discovery of dental tubules should contribute to an increase in resistance to recurrent caries.

2. The second method would be the cariostatic action of the reaction products between the SDF and the mineral part of the tooth. Fluoride treatment increased peri- and inter-tubular dentin resistance to acid decalcification and, consequently, delayed acid penetration into deeper parts of the dentin. SDF F^- ion embedded in dentin under vivo conditions penetrates to a depth of 50-100μ. SDF (Ag (NH3) 2F) was reported to react with tooth mineral hydroxyapatite (HA) (Ca10 (PO4) 6 (OH) 2) to release calcium fluoride (CaF2) and silver phosphate (Ag3PO4), which is responsible for the protection and strength of teeth.
3. The third method would be the antienzymatic actions of the reaction products between Ag (NH3) 2Fand the active part of the tooth. Its antibacterial properties are derived from inhibition of enzyme activity and dextran synthesis by cariogenic strains of Streptococcus mutans. Sunada et al. found that dentin, treated with Ag (NH3) 2OH by ionophoresis increased resistance to trypsin. They said it was probably due to the reaction of Ag and the living component of dentin. These

actions of Ag and Ag (NH3) 2F in the living parts of the tooth can also contribute to the prevention of caries.

Clinical Application of Silver Diamine Fluoride.

1. The ability of SDF to arrest caries in anterior primary teeth of young children in pre-school children, many of the invading teeth become infected with caries, and a very large number of children have what is called “early childhood rot” which takes a sharp course. However, the treatment of such abnormal teeth involves many complications, so most patients are left untreated at present. Tooth decay not only plays an important role in the eruption and growth of permanent teeth, but it is also important for the growth of jaw bone, that is, on the growth and development of the face. From such a perspective, it would make sense to sacrifice a measure of beauty to some degree, if the continuation of the teeth could be bound by the use of a solution. A previous method of highly contagious chemicals was to remove possible dentin and to use zinc oxide eugenol as a temporary replacement. Unfortunately, the pattern of caries is not so common.

Nishino et al. (1969) and Moritani et al. (1970) found a small increase in children receiving SDF compared with those without SDF therapy, and in more rare cases complaining of pain in the cool or warm air, or the contradiction that the pores were closed continuously. Chu, Lo and Lin (2002) found that SDF is effective in binding dentin to the inner teeth of pre-school children in the Community Caries Management System

To prevent pit and fissure caries Pits and fissures are more affected by tooth decay than a smooth surface for behavioral reasons. It is also difficult to clean holes and cracks in unpreferable positions with a toothbrush. Although it is difficult to obtain incipient lesion in holes and crevices, the application of topical fluoride is shown to be less effective in protecting the cavity and cracks than in the smooth surface.

2. According to Sato et al. (1970), due to its anti-antibacterial and caries protective properties its SDF maybe effective in preventing cavities and cracks in the first molar teeth. Nishino and Massler (1977) in their study noted that the points of dental caries treated with Ag (NH3) 2Fwere significantly lower than those treated with SnF2 8% orAg (NO)

Precautions: Due to the gray and black color in the hole and the formation of the SDF can be confused with undetectable detection, so the application should be recorded.

3. To prevent secondary caries True adherence has been a "sacred grail" for decades. As many restorative substances used in conventional dentistry today are either completely attached to the tooth structure or cannot be completely dissolved in the oral fluid; saliva, bacteria and food debris enter the space between the walls of the pit and the building materials that restore it. Therefore, the pit wall may always be vulnerable to recurring signs.
4. Prevention of recurrent caries, therefore, resistance to the pit wall in caries should be improved. Shimizu and Kawagoe(1976) did not find recurrent decay in the restoration of amalgam to baseline teeth previously treated with SDF after26 months

Drawback of Silver Diamine Fluoride

Going back to using SDF to bind caries that the lesions will have dark spots; therefore, some children and their parents may be unhappy about the quality of the treatment. It has

been suggested that when dentin was treated with SDF, silver phosphate was formed, and this did not dissolve. Silver phosphate is yellow when it is first formed, but turns dark under the sun or the influence of reducing agents.

Overcoming this limit K Knight et al. proposed use of potassium iodide after the inclusion of SDF in the formation of remaining teeth

of silver ions in solution will react with potassium iodide to reduce the greenish white silver.

Indication of SDF

- Early childhood caries
- Children suffering from xerostomia
- Hard to reach areas in the oral cavity
- Acceptable treatment for Individuals with challenging behavior
- Individual whose other safe dental treatment is forbidden because of medical issues
- Treatment of hypersensitivity dentin

Contraindication

- Teeth that need pulp therapy (acute pulpitis or necrosis)
- Individual with silver allergy
- Individual with mouth sores because SDF already can be irritant agent

Application of SDF

- Dispense the SDF in to dappen dish
- Each drop treats five surfaces
- Isolate the tooth with cotton roll and use the air drying to increase the effectiveness of the treatment

- Immerse a stiff micro brush in to the SDF and saturate the lesion with SDF using scrubbing motion
- Allow the SDF to soak in to the lesion for 1-3 minutes
- In proximal caries lesion a small spongy floss is used to saturate the lesion and then pull the floss to the contact area
- It is preferable to seal the SDF application with petroleum jelly
- Using the petroleum jelly in this protocol is used as a temporary barrier between the SDF and the saliva

limitations of Silver Diamine Fluoride

Going back to using SDF to bind caries that the lesions will have dark spots; therefore, some children and their parents may be unhappy about the quality of the treatment. It has been suggested that when centous dentin was treated with SDF, silver phosphate was formed, and this did not dissolve. Silver phosphate is yellow when it is first formed, but turns dark color under the sun or the influence of reducing agents. Overcoming this limit K Knight et al. proposed use of potassium iodide after the inclusion of SDF in the formation of remaining teeth of silver ions in solution will react with Potassium Iodide to reduce the greenish white silver crystals.

Therefore, free silver ions are no longer available to react with sulfur and other oral reagents to form blackholes in the teeth. More

research in this way is still needed. In addition, SDF can contaminate body skin and clothing. The stain caused by SDF on the skin, although not causing any pain, cannot be washed away, and it takes a long time to remove. If the skin or clothes are stained, the following procedure is recommended: (a) Wash with running water, soap, or ammonia, as soon as possible after staining. (b)If the color change cannot be removed and continued, use a solution of sodium hypochlorite or powder bleaching (with caution with dyed cloth). SDF solution also has an unpleasant metallic taste. In addition, gingival and mucosal irritation is possible. In most cases, the damage goes away and the affected tissues become white, but they will heal within 1-2 days. If the solution is to be applied to wounds that are very close to the gingiva, use a rubber pool, or protect the gingiva with Vaseline or cocoa butter

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