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**PERCEPÇÃO ESTÉTICA DO MANCHAMENTO
DECORRENTE DO USO DO DIAMINO FLUORETO DE PRATA EM
MOLARES PERMANENTES**

Santa Maria, RS
2020

Jéssica Fogliato Ribeiro

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DO DIAMINO FLUORETO DE PRATA EM MOLARES PERMANENTES**

Dissertação apresentada ao Programa de Pós-Graduação em Ciências Odontológicas da Universidade Federal de Santa Maria (UFSM), como requisito parcial para a obtenção do título de **Mestre em Ciências Odontológicas com ênfase em Odontopediatria.**

Orientadora: Prof^ª. Dra. Rachel de Oliveira Rocha

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RESUMO

PERCEPÇÃO ESTÉTICA DO MANCHAMENTO DECORRENTE DO USO DO DIAMINO FLUORETO DE PRATA EM MOLARES PERMANENTES

AUTORA: Jéssica Fogliato Ribeiro
ORIENTADORA: Rachel de Oliveira Rocha

Este trabalho teve como objetivo comparar a percepção estética de pais/responsáveis de crianças assistidas em clínica odontológica, Cirurgiões-Dentistas e acadêmicos de Odontologia em relação ao manchamento decorrente do uso do diamino fluoreto de prata (DFP) em superfícies oclusais de molares permanentes. Uma amostra de conveniência composta por nove terceiros molares permanentes extraídos, foi selecionada de acordo com o critério de inclusão de ausência de lesão de cárie, opacidade ou descoloração, exceto três dentes, que deveriam apresentar fissuras oclusais escurecidas (pigmentadas), compatíveis com o escore 2 do International Caries Detection and Assessment System (ICDAS). Os dentes foram numerados e designados a um dos 3 grupos experimentais (n=3): G1- dentes com fissuras oclusais sem alterações; G2 - dentes com fissuras oclusais escurecidas; e G3 - dentes com fissuras tratadas com DFP. Os dentes foram submetidos ao exame visual, em sequência aleatória e de forma independente, por dez alunos do Curso de Graduação em Odontologia da Universidade Federal de Santa Maria (UFSM), dez Cirurgiões-Dentistas atuantes no município de Santa Maria, RS, e dez pais ou responsáveis por crianças atendidas na clínica de Odontopediatria da UFSM. A superfície oclusal de cada dente foi classificada como esteticamente aceitável/agradável ou esteticamente inaceitável/desagradável. Os dados obtidos foram analisados com testes de Kruskal-Wallis e Mann-Whitney, adotando o nível de significância de 5%. O software Minitab 19 (Minitab Inc., State College, PN, EUA) foi usado para cálculos. A percepção estética dos pais ou responsáveis foi diferente da observada pelos profissionais e acadêmicos para os dentes dos grupos 1 e 2. Pais/responsáveis classificaram como esteticamente inaceitável/desagradável dentes com fissuras sem alterações ou com fissuras pigmentadas. No entanto, os três grupos de avaliadores tiveram a mesma percepção estética quando as superfícies oclusais foram tratadas previamente com DFP ($p=0,07$), sendo a maioria dos dentes considerados como esteticamente inaceitável/desagradável. O manchamento provocado pela aplicação do DFP em superfícies oclusais de molares permanentes é, em geral, considerado desagradável ou esteticamente inaceitável.

Palavras-chave: Cariostáticos. Cárie dentária. Pigmentação. Estética dental.

ABSTRACT

AESTHETIC PERCEPTION OF THE STAINING CAUSED BY THE USE OF SILVER DIAMINE FLUORIDE IN PERMANENT MOLARS

AUTHOR: Jéssica Fogliato Ribeiro
SUPERVISOR: Rachel de Oliveira Rocha

The aim of this study was to compare the aesthetic perception of silver diamine fluoride (SDF) staining on occlusal surfaces of permanent molars by parents of children assisted at the Federal University of Santa Maria pediatric dentistry clinic, dentists, and academics. A convenience sample of nine extracted permanent third molars was selected according to the inclusion criteria of the absence of caries lesions, opacity or discoloration, except for three molars that should also have darkened occlusal fissures, compatible with International Caries Detection and Assessment System (ICDAS), score 2). Teeth were numbered and assigned for three experimental groups (n=3): G1: occlusal fissures with no changes; G2: stained occlusal fissures; G3: occlusal fissures treated with SDF. The teeth were subjected to visual examination, in random sequence and independently, by ten students of the Undergraduate Dentistry Course at the Federal University of Santa Maria (UFSM), ten dentists working in the city of Santa Maria, RS, and ten parents or guardians of children seen at the Pediatric Dentistry Clinic at UFSM. Each occlusal surface was classified as aesthetically acceptable or aesthetically unacceptable. The data obtained were analyzed using Kruskal-Wallis and Mann-Whitney tests, adopting a significance level of 5%. Minitab 19 software (Minitab Inc., State College, PN, USA) was used for calculations.

Results: The parents' aesthetic perception was different compared to professionals and students for teeth from groups 1 and 2. Parents considered the teeth with no occlusal visual changes as unacceptable, however the three kind of evaluators had similar perception for teeth from group 3 ($p=0.07$), as most of teeth was classified as aesthetically unacceptable.

Conclusion: The staining caused by SDF application on occlusal fissures is considered aesthetically unacceptable regardless of the evaluator.

Keywords: Cariostatic Agents. Dental Caries. Pigmentation. Esthetics Dental.

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1. INTRODUÇÃO

A doença cárie é considerada um problema de saúde pública significativa, a qual afeta crianças do mundo todo (PITTS et al. 2017). Tendo em vista lesões iniciais de cárie, poucos indivíduos não são afetados. Se tratando de crianças e trabalhando com a teoria minimamente invasiva (FOLEY 2006), podemos optar por procedimentos preventivos e efetivos na paralisação de lesões de cárie, como o uso do cariostático a base de diamino fluoreto de prata.

Soluções à base de diamino fluoreto de prata (DFP) têm sido empregadas com sucesso a fim de paralisar lesões de cárie em dentes decíduos, desde a década de 60 (ROSENBLATT et al., 2009). A capacidade de paralisar lesões de cárie e, simultaneamente, evitar a formação de novas lesões, deve-se a presença de fluoreto de sódio e nitrato de prata em sua composição, os quais têm efeito de impedir a desmineralização dos tecidos dentários afetados e apresenta ação bacteriostática, respectivamente. Além disso, sua aplicação tem como vantagens a redução da sensibilidade, pela obliteração dos túbulos dentinários (ROSENBLATT et al., 2009), o fato de ser um produto de baixo custo e com protocolo de aplicação fácil e rápido (HORST et al., 2016), além da durabilidade da ação preventiva fazem com que ele possa ser considerado como uma alternativa aos vernizes e selantes (OLIVEIRA et al., 2019), os quais apresentam um custo maior, maior número de aplicações e técnica mais invasiva, respectivamente.

O DFP mostrou-se mais efetivo do que outros tratamentos na paralisação de lesões de cárie, cavitadas ou não, em dentes decíduos (CHIBINSKI et al., 2017). Esse resultado é atribuído a soluções de DFP nas concentrações de 30% e 38%, sendo as menos concentradas, consideradas menos efetivas (HORST et al., 2016; FUNG et al., 2016; YEE et al., 2009). Dados referentes a paralisação de lesões de cárie em dentes permanentes não foram incluídos em recente revisão sistemática (CHIBINSKI et al., 2017), devido a variabilidade dos desfechos e das unidades de medida apresentada pelos estudos primários. No entanto, em estudos primários, o DFP parece ser efetivo também na redução da prevalência de lesões em primeiros molares permanente (BRAGA et al., 2009; LLODRA et al., 2005).

Uma das possíveis razões limitantes do emprego do DFP em dentes permanentes, é o escurecimento dos tecidos dentários. O manchamento decorrente da aplicação do DFP deve-se a formação de uma camada de fosfato de prata sobre o tecido desmineralizado e, adicionalmente, a precipitados de sulfeto de prata depositados na superfície dentária (PATEL et al., 2018).

Segundo Chu et al. (2002), a presença do escurecimento durante a paralisação da cárie, não causou insatisfação aos pacientes e responsáveis de forma significativa. Além disso, nos casos em que os pais têm que decidir se seus filhos devem ser submetidos a anestesia geral para tratamento, a taxa de aceitação dos pais de DFP como um método de tratamento aumentou para 68,5% em dentes posteriores e até 60,3% em dentes anteriores (CRYSTAL et al., 2016). As alterações estéticas decorrente do uso do DFP no tratamento de lesões extensas, no entanto, parecem influenciar negativamente a opinião de profissionais, sendo assim, um limitante na sua indicação. Embora a influência na opinião dos pais, como medida preventiva, seja duvidosa (MAGNO et al., 2019).

Ainda que os estudos em dentes permanentes sejam menos numerosos, o uso do DFP tem se mostrado como uma alternativa promissora na prevenção e paralisação de lesões de cárie em primeiros molares permanentes em período eruptivo (BRAGA et al., 2009; CHU et al., 2012). Deste modo, estudos que avaliam fatores relacionados ao uso do diamino fluoreto de prata, bem como, o manchamento causado pelo mesmo, são necessários.

2. ESTUDO

ARTIGO: AESTHETIC ACCEPTANCE OF SILVER DIAMINE FLUORIDE STAINING ON OCCLUSAL SURFACES OF PERMANENT MOLARS BY PARENTS, DENTAL STUDENTS AND DENTISTS.

O presente trabalho está apresentado em formato de manuscrito científico, que será submetido ao *International Journal of Paediatric Dentistry*; ISSN: 0960-7439; Fator de impacto = 1.383; Qualis A1. O artigo está de acordo com as normas desse periódico, as quais estão descritas no ANEXO A.

Article type: Original article

Aesthetic acceptance of silver diamine fluoride staining on occlusal surfaces of permanent molars by parents, dental students and dentists.

Running head: Aesthetic perception of silver diamine staining

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Conflict of interest

This paper does not have any conflict of interest.

Aesthetic acceptance of silver diamine fluoride staining on occlusal surfaces of permanent molars by parents, dental students and dentists.

Summary

Background: Off-label use of silver diamine fluoride (SDF) seems to be promising for caries prevention in permanent molars.

Aim: To compare the parental, professional, and student acceptance of SDF staining on occlusal surfaces of permanent molars.

Design: A group of thirty examiners - ten parents or guardians of children assisted at a university clinic, ten undergraduate students, and ten dentists, evaluated visually with assisted artificial light and classified, independently, based on personal judgment, as esthetically acceptable or esthetically unpleasant, the occlusal fissures of extracted permanent molars. The occlusal fissures had three clinical conditions: a) no signs of carious lesion, opacity or discoloration, b) fissures with dark-brown discoloration, and c) SDF stained fissures. Data were performed by the Kruskal-Wallis and Mann-Whitney tests at a significance level of 5%.

Results: Esthetically unpleasant scores were assigned by parents to fissures with no discoloration or dark-brown fissures. Parents had a different acceptance of occlusal fissures appearance compared to dental students and dentists, except when fissures were treated with SDF ($p=0.07$).

Conclusion: SDF staining in occlusal fissures of permanent molars was equally unacceptable by parents, dental students, and dentists.

Keywords: silver diamine fluoride, cariostatic, aesthetic acceptability.

Introduction

Silver diamine fluoride (SDF) is one of the most effective treatments for dental caries.¹ The combination of silver and fluoride seems to reduce the demineralization, aiding remineralization, besides the anti-microbial effect.^{2,3,4} Previous studies showed that SDF was also efficient in controlling initial occlusal caries in erupting permanent first molars^{5,6,7} though this effect has not been perceived as significant in another one.⁸ Besides, SDF is considered user-friendly⁹ easy to apply, and affordable. Thus, its off-label use has been interesting and promising for caries prevention in permanent first molars.

However, black staining is a frequent clinical observation following the SDF application, and it is considered a barrier to its clinical use.¹⁰ Parental satisfaction with the dental appearance of their children's teeth treated with SDF seems to be variable. Parents' acceptance may be considered as a complex and multidimensional process; dental caries status of their children, social class, access to conventional restorative care may impact on it.¹¹ Factors related to the low level of discomfort and ease application also can influence parental opinion^{12,13} as in many studies, the parent acceptability was measured using a questionnaire or photographs tacked before and after SDF treatment.^{12,9,14}

The literature regarding the acceptance of SDF staining in permanent teeth is practically nonexistent. Although Bagher et al.¹⁵ have considered permanent teeth, the SDF was used in carious lesions. Acceptance also increased when SDF was used in primary compared to permanent teeth.¹³ No previous studies investigated the aesthetic acceptance of parents or guardians, dental students, and professionals concerning the SDF staining in occlusal fissures of permanent molars. Thus, this study aimed to compare the parental, professional, and student acceptance of SDF staining on occlusal surfaces of permanent molars. The tested hypothesis was that there is no significant difference in parental acceptance of SDF stained occlusal fissures compared to professional and dental students.

Methods

Ethical concern and sample selection

The local Research Ethics Committee approved the research protocol, and all participants personal information was kept confidential. This study included a convenience sample of nine extracted human permanent molars that were obtained for research purposes with patients' informed consent. The teeth were selected according to the two inclusion

criteria: 1) occlusal fissures presenting no clinical signs of carious lesion, opacity or discoloration, and 2) occlusal fissures presenting dark- brown discoloration at the entrance of fissure (pigmented, compatible with ICDAS- International Caries Detection and Assessment System¹⁶, score 2). An examiner, who was not involved in the evaluations visually selected the teeth. Thus, six molars were selected according to the first inclusion criteria and three molars according to the second inclusion criteria.

Specimen preparation

Teeth were carefully cleaned with rotating bristle brush and pumice/water slurry and disinfected in 0.5% chloramine-T two days. They were included, by the root portion, in PVC rings 20 mm high and 25 mm in diameter, filled with self-curing acrylic resin (JET Classic, São Paulo, Brazil) and the specimens (tooth set + PVC ring) stored in distilled water at 4°C until used. Three teeth with occlusal fissures presenting no clinical signs of carious lesion, opacity or discoloration were treated with 30% silver diamine fluoride (Cariestop 30%, Biodinâmica, Ibitiporã, PR, Brazil) applied three times (with a week interval) for 60 seconds of dwell time according to manufacturer's instruction¹⁷ to obtain an SDF stained fissures. To favor the fissure staining, a previous acid etching was done (37% phosphoric acid, Biodinâmica, Ibitiporã, PR, Brazil). Thus, the teeth were grouped under the three occlusal fissures conditions (n=3): fissures with no clinical signs of carious lesion, opacity or discoloration; fissures with dark- brown discoloration, and SDF stained fissures.

Examiners

A group of thirty examiners participated in this investigation: ten parents or guardians of children assisted at the Pediatric Dentistry Clinic at the Federal University of Santa Maria; ten undergraduate students in the third year of study in the course of Dentistry; and ten dentists that had at least two years of clinical experience not being specialists in Pediatric Dentistry. Students and professionals had no previous experience with SDF. All examiners signed a statement of informed consent before the beginning of the study. All received basic information about the importance and methods of the study but did not receive any training.

Evaluation of the teeth

The examiners evaluated visually all dried teeth with assisted artificial light, independently, without distance limitation, and the occlusal fissures of each tooth were assessed, in a random order, and classified, based on personal judgment, as esthetically

acceptable or aesthetically unacceptable. The duration of each assessment was controlled in one minute using a digital timer.

Statistical analysis

Data were performed by the Kruskal-Wallis and Mann-Whitney tests, adopting the level of significance of 5%. Minitab 19 software (Minitab Inc., State College, PN, USA) was used for calculations.

Results

Parental, dental students and dentists' acceptance for occlusal fissures conditions are shown in Table 1. Parents had a different acceptance of occlusal fissures appearance ($p=0.000$), including no discolored, discolored, and SDF stained fissures, compared to dental students and professionals, that was similar. There was no significant difference between esthetically acceptable and unpleasant by parents' judgment ($p>0.05$), when all fissures conditions were combined, differently that were found in dental students' and professionals' ratings, with a trend to consider most of the fissures as esthetically acceptable. Identical findings were found when only no discolored and discolored occlusal fissures were considered (Tables 2 and 3).

The level of acceptance for SDF stained occlusal fissures was similar ($p=0.07$) among parents, students, and professionals, most of SDF stained fissures considered as aesthetically unpleasant (Table 4).

Discussion

Despite the well-documented effectiveness of SDF for arresting caries in primary¹⁷ and permanent dentition^{18,19}, black staining, a frequent clinical observation following the SDF application, is considered the primary barrier to its clinical use.¹⁰ The hypothesis of this study that there is no significant difference in parental, dental students, and professionals' acceptance of SDF stained fissures could not be rejected. It was found that teeth treated with SDF were unanimous considered aesthetically unpleasant by parents, dental students, and professionals.

Low levels of parental acceptance of SDF staining have been reported in the previous studies^{14,15,21,22} as staining in posterior teeth is more acceptable to parents than staining in

anterior teeth.^{14,22,11} Parents' acceptance may be considered as a complex and multifactorial process; dental caries status of their children, social class, and access to conventional restorative care may impact on it.¹¹ Also, parental acceptance of the SDF staining has been evaluated considering primary carious teeth, and only one study assess the parental acceptance of SDF treatment in permanent teeth.¹⁵ To our knowledge, this is the first study to investigate the parents', dental students', and professionals' acceptance of SDF staining in occlusal fissures of permanent molars. Furthermore, teeth with no discoloration and dark-brown discoloration not associated with SDF use were included in the evaluation by parents, dental students, and professionals.

Parents' satisfaction has been usually reported considering the use of SDF to arrest cavitated carious lesions¹¹ in primary teeth, and several factors could influence parents' opinion, as the understanding that primary teeth will be lost, child's cooperation,¹⁵ and demographic factors.^{14,22} In a study by Bagher et al.¹⁵ parental acceptance of the staining associated with SDF was lower when the product was used in permanent compared to primary teeth. Our results agree with this finding, as SDF staining was not acceptable by parents, even in permanent posterior teeth. It is important to consider that the parents participating in the study were responsible for children attended at the Federal University and that most children have a high risk of caries.²³

In general, in the current study, parents had a different acceptance of occlusal fissures appearance compared to dental students and dentists. Esthetically unpleasant scores were assigned by parents to fissures with no discoloration and dark-brown fissures, not resulting from SDF treatment. Alterations in dental enamel may have a significant impact on aesthetic parents' perception^{24,25} mainly in anterior teeth²⁵ but could explain our findings. The subjective feelings of the parents about occlusal fissures appearance could be correlated with their children's previous caries experience, so only narrow and non-pigmented fissures were considered aesthetically acceptable. Contrary to parents' view, most of the occlusal surfaces that were not SDF treated were considered, as esthetically acceptable by dental students and by dentists. Clinical experience does not seem to affect the esthetic perception, as no significant difference was found between dental students' and professionals' scores, regardless of the occlusal fissures condition.

SDF seems to be a potential alternative to caries prevention in permanent first molars,¹⁹ besides being inexpensive and user-friendly. Thus, evidence-based information regarding parental's and professional's acceptance would be valuable to support its use as a

clinical routine. However, the present study findings showed that occlusal surfaces treated with SDF were considered aesthetically unpleasant by parents, dental students, and professionals. Although parents have also rejected SDF staining in permanent molars in a previous study that used colored pictures,¹⁵ in the present study, the use of extracted teeth, evaluated individually, one by one, may favor the overestimation of SDF staining and, consequently, this non-acceptance.

Although the evidence-based information from this study regarding the parental, dental students and dentists acceptance of SDF staining in sound occlusal fissures of permanent molars, the small number of participants, and the use of extracted teeth (evaluations outside the mouth) limit the power of the study. However, it would not be possible to perform the clinical evaluation of children, given the limited collaboration and the impossibility of subject the same child to 3 different groups of examiners. The selection of a limited number of teeth was in order to avoid evaluator fatigue and in addition, previous studies also used a limited number of teeth and evaluators.^{21,27} Our results highlight the need for future studies, including the professional acceptability of dental appearance after SDF used as a preventive tool, as well as, the staining can influence the treatment decision.

The findings from this study show that the discoloration in occlusal fissures in permanent molars is more acceptable to dental students and dentists than to parents. SDF staining in occlusal fissures of permanent molars was equally unacceptable by parents, dental students, and dentists. Therefore, dental appearance after SDF treatment can be a barrier to its use.

Why is this paper important to paediatric dentists?

The paediatric dentists must be aware that SDF staining in occlusal fissures of permanent molars was equally unacceptable by parents, dental students, and dentists.

References

1. Chibinski AC, Wambier LM, Feltrin J, Loguercio AD, Wambier DS, Reis A Silver Diamine Fluoride Has Efficacy in Controlling Caries Progression in Primary Teeth: A Systematic Review and Meta-Analysis. *Caries Res* 2017; 51:527–541.
2. Chu CH, Lo ECM and Lin HC. Effectiveness of Silver Diamine Fluoride and Sodium Fluoride Varnish in Arresting Dentin Caries in Chinese Pre-school Children. *J Dent Res* 2002; 81:767-770.
3. Liu B, Lo ECM, Li C. Effect of silver and fluoride ions on enamel demineralization: a quantitative study using micro-computed tomography. *Aust Dent J* 2012;57:65–70.
4. Rosenblatt, A.; Stamford, T. C. M.; Niederman, R. Silver diamine fluoride: A caries “silver-fluoride bullet”. *J Dent Res* 2009;88:116–125.
5. Braga MM, Mendes FM, De Benedetto MS, Imparato JC. Effect of silver diamine fluoride on incipient caries lesions in erupting permanent first molars: a pilot study. *J Dent Child* 2009;1:28–33.
6. Llodra, J. C. et al. Efficacy of silver diamine fluoride for caries reduction in primary teeth and first permanent molars of schoolchildren: 36-Month clinical trial. *J Dent Res* 2005; 84:721–724.
7. Liu, B. Y. et al. Randomized trial on fluorides and sealants for fissure caries prevention. *J Dent Res* 2012;91:753–758.
8. Monse B, Heinrich-Weltzien R, Mulder J, Holmgren C, Van Palenstein Helderman WH. Caries preventive efficacy of silver diamine fluoride (SDF) and ART sealants in a school-based daily fluoride tooth brushing program in the Philippines. *BMC Oral Health* 2012;21:12:52.
9. Chu CH, Lo EC. Promoting caries arrest in children with silver diamine fluoride: a review. *Oral Health Prev Dent* 2008;6:315–321.
10. Nelson T, Scott JM, Crystal YO, Berg JH, Milgrom P. Silver diamine fluoride in pediatric dentistry training programs: survey of graduate program directors. *Pediatr Dent* 2016;38:212-217
11. Duangthip D, Fung MHT, Wong MCM, Chu CH, Lo ECM. Adverse Effects of Silver Diamine Fluoride Treatment among Preschool Children. *J Dent Res* 2018;97:395–401.

12. Clemens J, Gold J, Chaffin J. Effect and acceptance of silver diamine fluoride treatment on dental caries in primary teeth. *J Public Health Dent* 2018;78:63–68.
13. Magno MB, Silva LPD, Ferreira DM, Barja-Fidalgo F, Fonseca-Gonçalves A. Aesthetic perception, acceptability and satisfaction in the treatment of caries lesions with silver diamine fluoride: A scoping review. *Int J Paediatr Dent* 2019;29:257-26
14. Crystal YO, Janal MN, Hamilton DS, Niederman R. Parental perceptions and acceptance of silver diamine fluoride staining. *J Am Dent Assoc* 2017;148:510–518.e4.
15. Bagher SM, Sabbagh HJ, Aljohani SM, Alharbi G, Aldajani M, Elkhodary H. Parental acceptance of the utilization of silver diamine fluoride on their child's primary and permanent teeth patient Preference Adherence 2019;13:829–835.
16. Pitts NB, Ekstrand KR, ICDAS Foundation. International Caries Detection and Assessment System (ICDAS) and its International Caries Classification and Management System (ICCMS) - methods for staging of the caries process and enabling dentists to manage caries *Community Dent Oral Epidemiol* 2013;41:41-52
17. Horst JA., et al. UCSF Protocol for Caries Arrest Using Silver Diamine Fluoride: Rationale, Indications, and Consent. *J Calif Dent Assoc* 2016 ; 44: 16–28.
18. Seifo N, Cassie H, Radford JR, Innes NPT. Silver diamine fluoride for managing carious lesions: an umbrella review. *BMC Oral Health* 2019;19:145.
19. Contreras V, Toro MJ, Elías-Boneta AR, Encarnación-Burgos A. Effectiveness of silver diamine fluoride in caries prevention and arrest: a systematic literature review. *Gen Dent* 2017;65:22–29.
20. Seifo N, Robertson M, Maclean J, et al. The use of silver diamine fluoride (SDF) in dental practice. *Br Dent J* 2020; 228:75–81.
21. Crystal YO, Kreider B, Raveis VH. Parental Expressed Concerns about Silver Diamine Fluoride (SDF) Treatment. *J Clin Pediatr Dent.* 2019;43:155–160.
22. Alshammari AF, Almuqrin AA, Aldakhil AM, Alshammari BH, Lopez JNJ. Parental perceptions and acceptance of silver diamine fluoride treatment in Kingdom of Saudi Arabia. *Int J Health Sci Qassim* 2019;13:25–29.
23. Pedrotti D., et al. Survival and Associated Risk Factors of Resin-based Composite Restorations in Primary Teeth: A Clinical, Retrospective, University-based Study. *Pediatric Dentistry* 2017;39.

24. S. L. Sujak, A. Kadir, R. Dom, And T. Esthetic perception and psychosocial impact of developmental enamel defects among Malaysian adolescents. *J Oral Sci* 2004;46:221-227.
25. Rodd HD, Abdul-Karim A, Yesudian G, O'mahony J, Marshman Z. Seeking children's perspectives in the management of visible enamel defects. *Int J Paediatr Dent* 2011;2:89-95.
26. Lalumandier JA., Rozier RG., Parents' satisfaction with children's tooth color: fluorosis as a contributing factor. *J Am Dent Assoc.*1998;129:1000-6.
27. Turchiello RZ, Braga MM, Rocha RO, Rodrigues JA, Lenzi TL. Do undergraduate dental students perform well detecting and staging caries and assessing activity by visual examination? A systematic review and meta-analysis. *Int J Paediatr Dent.*, 2019;29:281-293.

Table 1. Number (%) of esthetically acceptable or esthetically unpleasant scores for sound, pigmented and silver diamine fluoride treated fissures on the occlusal surfaces of molars by parents, dental students and dentists.

Examiner	Esthetically acceptable	Esthetically unpleasant	Z-Value*
Parents	40 (44.4)	50 (55.6)	3.7 (a)
Dental Students	63 (70.0)	27 (30.0)	-1.4 (b)
Dentists	67 (74.4)	23 (25.6)	-2.3 (b)
Kruskal -Wallis p=0.000 * Mann-Whitney p<0.05 Values with different letters indicate statistically significant differences.			

Table 2. Number of esthetically acceptable or esthetically unpleasant scores for sound fissures on the occlusal surfaces of molars by parents, dental students and dentists.

Examiner	Esthetically acceptable	Esthetically unpleasant	Z-Value*
Parents	25	5	1.3 (a)
Dental Students	30	0	-0.6 (b)
Dentists	30	0	-0.6 (b)
Kruskal -Wallis p=0.005 * Mann-Whitney p<0.05 Values with different letters indicate statistically significant differences.			

Table 3. Number of esthetically acceptable or esthetically unpleasant scores for pigmented fissures on the occlusal surfaces of molars by parents, dental students and dentists.

Examiner	Esthetically acceptable	Esthetically unpleasant	Z-Value*
Parents	17	13	3.7 (a)
Dental Students	27	3	-1.7 (b)
Dentists	28	2	-2.1 (b)
Kruskal -Wallis p=0.000 * Mann-Whitney p<0.05 Values with different letters indicate statistically significant differences.			

Table 4. Number of esthetically acceptable or esthetically unpleasant scores for silver diamine fluoride treated fissures on the occlusal surfaces of molars by parents, dental students and dentists.

Examiner	Esthetically acceptable	Esthetically unpleasant	Z-Value*
Parents	2	28	-1.3 (a)
Dental Students	6	24	-0.1(a)
Dentists	9	21	1.4 (a)
Kruskal -Wallis p=0.07			

3. CONCLUSÃO

Este estudo mostrou que a descoloração nas fissuras oclusais em molares permanentes é mais aceitável para dentistas e estudantes de odontologia do que para os pais/ responsáveis. Já a coloração causada pelo uso do DFP nas fissuras oclusais dos molares permanentes foi igualmente inaceitável pelos pais, estudantes e dentistas. Demonstrando assim, que a aparência dental após a aplicação do DFP pode ser uma barreira ao seu uso. Apesar disso, o DFP tem se mostrado uma boa alternativa à prevenção de cárie em primeiros molares permanentes¹⁹, além de ser de baixo custo e de fácil aplicação. Assim, as informações baseadas em evidências sobre a aceitação dos pais e do profissional são valiosas para apoiar seu uso como uma rotina clínica, além disso, nossos resultados destacam a necessidade de estudos futuros, incluindo a aceitabilidade profissional da aparência dentária após o DFP utilizado como ferramenta preventiva.

REFERÊNCIAS

PITTS NB, ZERO DT, MARSH PD, EKSTRAND K, WEINTRAUB JA, RAMOS-GOMEZ F, TAGAMI J, TWETMAN S, TSAKOS G, ISMAIL A. **Dental caries. Nat Rev Dis Primers**, v.25, n. 3, p. 17-30, 2017.

CHU CH. ET AL. Randomized trial on fluorides and sealants for fissure caries prevention. **Journal of Dental Research**, v. 91, n. 8, p. 753–758, 2012.

FOLEY J. Alternative treatment strategies for carious primary teeth: an overview of the evidence. **Eur Arch Paediatr Dent**, v.7, p. 73–80, 2006.

ROSENBLATT, A.; STAMFORD, T. C. M.; NIEDERMAN, R. Silver diamine fluoride: A caries “silver-fluoride bullet”. **Journal of Dental Research**, v. 88, n. 2, p. 116–125, 2009.

HORST JA., ET AL. UCSF Protocol for Caries Arrest Using Silver Diamine Fluoride: Rationale, Indications, and Consent. **J Calif Dent Assoc**, v. 44, n.1, p. 16–28, 2016.

CHIBINSKI, ANA CLÁUDIA ET AL. Silver Diamine Fluoride Has Efficacy in Controlling Caries Progression in Primary Teeth: A Systematic Review and Meta-Analysis. **Caries Research**, v. 51, n. 5, p. 527–541, 2017.

HORST, JEREMY A.; ELLENKIOTIS, HELLENE; MILGROM, PETER M. UCSF Protocol for Caries Arrest Using Silver Diamine Fluoride: Rationale, Indications, and Consent. **Journal of the California Dental Association**, v. 44, n. 1, p. 17–28, 2016.

M.H.T. FUNG, D. DUANGTHIP, M.C.M. WONG, E.C.M. LO, AND C. H. CHU1. Arresting Dentine Caries with Different Concentration and Periodicity of Silver Diamine Fluoride. **Original Report: Epidemiologic Research**, v. 1, n. 2, p. 143–152, 2016.

YEE, R. ET AL. Efficacy of silver diamine fluoride for arresting caries treatment. **Journal of Dental Research**, v. 88, n. 7, p. 644–647, 2009.

BRAGA MM, MENDES FM, DE BENEDETTO MS, IMPARATO JC. Effect of silver diammine fluoride on incipient caries lesions in erupting permanent first molars: a pilot study. **J Dent Child**, v. 1, n. 76, p. 28–33, 2009.

LLODRA, J. C. ET AL. Efficacy of silver diamine fluoride for caries reduction in primary teeth and first permanent molars of schoolchildren: 36-Month clinical trial. **Journal of Dental Research**, v. 84, n. 8, p. 721–724, 2005.

PATEL, JILEN; ANTHONAPPA, ROBERT P.; KING, NIGEL M. Evaluation of the staining potential of silver diamine fluoride: In vitro. **International Journal of Paediatric Dentistry**, p. 1–9, 2018.

CRYSTAL, YASMI O; RICHARD NIEDERMAN. Silver Diamine Fluoride Treatment Considerations in Children’s Caries Management Brief Communication and Commentary. **Pediatr Dent**, v. 38, n. 7, p. 466–471, 2016.

MAGNO MB, SILVA LPD, FERREIRA DM, BARJA-FIDALGO F, FONSECA-GONÇALVES A. Aesthetic perception, acceptability and satisfaction in the treatment of caries lesions with silver diamine fluoride: A scoping review. **Int J Paediatr Dent**, 2019.

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Paulsson L, Bondemark L, Söderfeldt B. A systematic review of the consequences of premature birth on palatal morphology, dental occlusion, tooth-crown dimensions, and tooth maturity and eruption. *Angle Orthodontist* 2004; 74: 269-279.

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2. Voet D, Voet JG. *Biochemistry*. New York: John Wiley & Sons; 1990. 1223 p.

Internet document

3. American Cancer Society. *Cancer Facts & Figures 2003*.
<http://www.cancer.org/downloads/STT/CAFF2003PWSecured.pdf> Accessed March 3, 2003

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