

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Silver Diamine Fluoride and Fluoride Varnish for the Prevention and Arresting of Dental Caries in Pediatric Populations: Clinical Effectiveness and Guidelines

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Research Questions

1. What is the clinical effectiveness of silver diamine fluoride used in combination with fluoride varnish for the prevention and arrestment of dental caries in pediatric populations?
2. What are the evidence-based guidelines regarding the use of silver diamine fluoride for the prevention and arrestment of dental caries in pediatric populations?

Key Findings

One non-randomized study was identified regarding the clinical effectiveness of silver diamine fluoride used in combination with fluoride varnish for the prevention and arrestment of dental caries in pediatric populations. In addition, three evidence-based guidelines were identified regarding the use of silver diamine fluoride for the prevention and arrestment of dental caries in pediatric populations.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were silver diamine fluoride and the paediatric population. Search filters were applied to limit retrieval to guidelines for Q2 only. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2015 and April 23, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Pediatric populations (<18 years of age)
Intervention	Q1: Silver diamine fluoride used in combination with fluoride varnish Q2: Silver diamine fluoride
Comparator	Q1: Silver diamine fluoride alone; fluoride varnish alone Q2: Not applicable

Outcomes	Q1: Clinical effectiveness (e.g., incidence of dental caries, severity of tooth decay, tooth remineralization); Adverse events Q2: Recommendations regarding best practices (e.g., application protocols)
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, and evidence-based guidelines

Results

One non-randomized study¹ was identified regarding the clinical effectiveness of silver diamine fluoride used in combination with fluoride varnish for the prevention and arrestment of dental caries in pediatric populations. In addition, three evidence-based guidelines²⁻⁴ were identified regarding the use of silver diamine fluoride for the prevention and arrestment of dental caries in pediatric populations. No relevant health technology assessments, systematic reviews, or randomized controlled trials were identified.

References of potential interest that did not meet the inclusion criteria are provided in the appendix.

Overall Summary of Findings

One non-randomized study¹ was identified regarding the clinical effectiveness of silver diamine fluoride (SDF) used in combination with fluoride varnish for the prevention and arrestment of dental caries in pediatric populations. The authors found that majority of carious lesions in low-risk pediatric patients showed radiographic evidence of non-progression 12 months following SDF and fluoride varnish application.¹

Three evidence-based guidelines²⁻⁴ were identified regarding the use of silver diamine fluoride for the prevention and arrestment of dental caries in pediatric populations. One guideline from the American Academy of Pediatric Dentistry recommends the use of 38 percent SDF on cavitated lesions in high-risk pediatric patients.² Another guideline from the American Academy of Pediatric Dentistry elaborates that the aforementioned recommendation is conditional and based on low-quality evidence.³ Finally, the American Dental Association recommends biannual application of 38 percent SDF to arrest advanced cavitated carious lesions in primary teeth.⁴

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-Analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

Pre-Post Intervention Study

1. Hammersmith KJ, DePalo JR, Casamassimo PS, MacLean JK, Peng J. Silver Diamine Fluoride and Fluoride Varnish May Halt Interproximal Caries Progression in the Primary Dentition. *J Clin Pediatr Dent.* 2020;44(2):79-83.
[PubMed: PM32271666](#)

Guidelines and Recommendations

2. Caries-risk Assessment and Management for Infants, Children, and Adolescents. The reference manual of pediatric dentistry. Chicago (IL): American Academy of Pediatric Dentistry (AAPD). 2019:
https://www.aapd.org/media/Policies_Guidelines/BP_CariesRiskAssessment.pdf
See: Table 3. Example of a Caries Management Pathways for 0-5 Years Old, page 222; Table 4. Example of a Caries Management Pathways for ≥6 Years Old, page 223
3. Use of Silver Diamine Fluoride for Dental Caries Management in Children and Adolescents, Including Those with Special Health Care Needs. *Pediatr Dent.* 2018 Oct 15;40(6):152-161.
[PubMed: PM32074885](#)
4. Slayton RL, Urquhart O, Araujo MWB, et al. Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: A report from the American Dental Association. *J Am Dent Assoc.* 2018 Oct;149(10):837-849.e819.
[PubMed: PM30261951](#)

Appendix — Further Information

Previous CADTH Reports

5. Silver Diamine Fluoride for the Prevention and Arresting of Dental Caries or Hypersensitivity: A Review of Clinical Effectiveness, Cost-Effectiveness and Guidelines. (*CADTH Rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2017. <https://www.cadth.ca/silver-diamine-fluoride-prevention-and-arresting-dental-caries-or-hypersensitivity-review-clinical>

Systematic Reviews and Meta-Analyses

Alternative Intervention — Silver Diamine Fluoride Only

6. Oliveira BH, Rajendra A, Veitz-Keenan A, Niederman R. The Effect of Silver Diamine Fluoride in Preventing Caries in the Primary Dentition: A Systematic Review and Meta-Analysis. *Caries Res*. 2019;53(1):24-32. [PubMed: PM29874642](#)
7. Seifo N, Cassie H, Radford JR, Innes NPT. Silver diamine fluoride for managing carious lesions: an umbrella review. *BMC Oral Health*. 2019 Jul 12;19(1):145. [PubMed: PM31299955](#)
8. Trieu A, Mohamed A, Lynch E. Silver diamine fluoride versus sodium fluoride for arresting dentine caries in children: a systematic review and meta-analysis. *Sci Rep*. 2019 Feb 14;9(1):2115. [PubMed: PM30765785](#)

Randomized Controlled Trials

Study Protocol

9. Ruff RR, Niederman R. Silver diamine fluoride versus therapeutic sealants for the arrest and prevention of dental caries in low-income minority children: study protocol for a cluster randomized controlled trial. *Trials*. 2018 Sep 26;19(1):523. [PubMed: PM30257696](#)

Alternative Intervention — Silver Diamine Fluoride Only

10. Duangthip D, Fung MHT, Wong MCM, Chu CH, Lo ECM. Adverse Effects of Silver Diamine Fluoride Treatment among Preschool Children. *J Dent Res*. 2018 Apr;97(4):395-401. [PubMed: PM29237131](#)
11. Duangthip D, Wong MCM, Chu CH, Lo ECM. Caries arrest by topical fluorides in preschool children: 30-month results. *J Dent*. 2018 Mar;70:74-79. [PubMed: PM29289726](#)
12. Fung MHT, Duangthip D, Wong MCM, Lo ECM, Chu CH. Randomized Clinical Trial of 12% and 38% Silver Diamine Fluoride Treatment. *J Dent Res*. 2018 Feb;97(2):171-178. [PubMed: PM28846469](#)

13. Duangthip D, Chu CH, Lo EC. A randomized clinical trial on arresting dentine caries in preschool children by topical fluorides--18 month results. *J Dent*. 2016 Jan;44:57-63.
[PubMed: PM26037274](#)

Alternative Comparator

14. Pisannturakit P, Detsomboonrat P. Comparison of two caries prevention programs among Thai kindergarten: a randomized controlled trial. *BMC Oral Health*. 2020 Apr 19;20(1):119.
[PubMed: PM32306953](#)

Review Articles

15. Seifo N, Robertson M, MacLean J, et al. The use of silver diamine fluoride (SDF) in dental practice. *Br Dent J*. 2020 Jan;228(2):75-81.
[PubMed: PM31980777](#)
16. Timms L, Sumner O, Deery C, Rogers HJ. Everyone else is using it, so why isn't the UK? Silver diamine fluoride for children and young people. *Community Dent Health*. 2020 Mar 24.
[PubMed: PM32212436](#)
17. Crystal YO, Niederman R. Evidence-Based Dentistry Update on Silver Diamine Fluoride. *Dent Clin North Am*. 2019 Jan;63(1):45-68.
[PubMed: PM30447792](#)
18. Horst JA, Heima M. Prevention of Dental Caries by Silver Diamine Fluoride. *Compend Contin Educ Dent*. 2019 Mar;40(3):158-163; quiz 164.
[PubMed: PM30829497](#)
19. Almugren WM, Alharbi DM. An overview of silver diamine fluoride in pediatric dentistry. *Int J Sci Engineer Res*. 2018;9(7): <https://www.ijser.org/researchpaper/AN-OVERVIEW-OF-SILVER-DIAMINE-FLUORIDE-IN-PEDIATRIC-DENTISTRY.pdf>
20. Horst JA. Silver Fluoride as a Treatment for Dental Caries. *Adv Dent Res*. 2018 Feb;29(1):135-140.
[PubMed: PM29355428](#)

Additional References

21. Liu JA, Donly KJ. The use of silver diamine fluoride for caries arrest in children. *Dental Economics*. 2019: <https://www.dentaleconomics.com/science-tech/pediatric-dentistry/article/14037011/the-use-of-silver-diamine-fluoride-for-caries-arrest-in-children>
See: Clinical procedure of SDF application
22. Chairsides Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions. *Pediatr Dent*. 2018 Oct 15;40(6):492-517.
[PubMed: PM32074924](#)