Policy on Use of Fluoride

Latest Revision

2023

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Purpose

The American Academy of Pediatric Dentistry (**AAPD**) affirms that the use of fluoride in the prevention of caries is safe and effective. The AAPD encourages dentists and dental professionals, other health care providers, public health officials, and parents/caregivers to optimize fluoride exposures to reduce the risk for caries and to enhance the remineralization of affected teeth.

Methods

This document was developed by the Liaison with Other Groups Committee, adopted in 1967[1], and last revised in 2018[2]. An electronic database search using the terms: *fluoride*, *fluoridation*, *acidulated phosphate fluoride*, *fluoride varnish*, *fluoride therapy*, and *topical fluoride* was conducted to develop and update this policy. The current update relied upon systematic reviews, expert opinions, and best current practices. The use of silver diammine fluoride is addressed in a separate AAPD policy.[3]

Background

Fluoride acts in 3 important ways to prevent caries: 1) by strengthening enamel through the creation of fluorapatite, 2) by remineralizing enamel, and 3) by affecting microbial metabolism and reducing acid production by cariogenic bacteria.[4]

Community water fluoridation is recognized as 1 of the 10 greatest public health achievements of the twentieth century because it is a beneficial and inexpensive population-based approach that can reach the entire community.[5] By definition, community water fluoridation is the process of adjusting the fluoride in community water supplies to optimal concentration for preventing caries.[6] Results from a recent systematic review on the economic evaluation of community water fluoridation reveal fluoridation of water is associated with fewer dental treatment costs.[7] When public water is fluoridated to an optimal level, there is a 35% reduction in decayed, missing, and filled primary teeth and 26% fewer decayed, missing, and filled permanent teeth.[8] The occurrence of dental fluorosis, causing dental esthetic concerns, has been reported to be 12 percent when public water contains 0.7 parts per million (ppm) or milligrams per liter (mg/L) fluoride.[8] When combined with other dietary, oral hygiene, and preventive measures[6], the use of fluorides can further reduce the incidence of caries.

When a child's home drinking water supply does not contain fluoride, the caries-preventive benefits of fluoride can be achieved through the intake of daily fluoride supplements according to established guidelines.[6,9-11] Before supplements are prescribed, careful review of all dietary sources of fluoride (eg, additional sources of drinking water [daycare, school, sports facilities, bottled water], other consumed beverages, prepared foods [including infant formula], toothpaste) will help establish the child's true exposure to fluoride.[6,12,13] This information, along with the child's assessed caries risk, can be used to determine a need for fluoride supplementation.

The mean fluoride concentration of ready-to-feed infant formulas in the US is 0.15 ppm for milk-based formulas and 0.21 ppm for soy-based formulas.[14] The more important issue, however, is the fluoride content of concentrated or powdered infant formula when reconstituted with fluoridated water. The range of fluoride (in ppm) for reconstituted powdered or liquid concentrate when reconstituted with water containing 1 ppm fluoride is 0.64 to 1.07.[14] As communities adjust their municipal water supplies to align with the US Department of Health and Human Services' 2015 recommendation of 0.7 ppm fluoride[15], the risk of dental fluorosis due to reconstituting infant formula with fluoridated water is decreased.

Significant cariostatic benefits can be achieved by the use of over-the-counter fluoride-containing products such as toothpastes, topically-applied gels, and oral rinses, especially in areas without fluoridated drinking water.[6,16-20] Toothbrushing with appropriate amounts of fluoride toothpaste twice daily is recommended for all children.[10,21] Monitoring children's use of topical fluoride-containing products, including toothpaste, may prevent ingestion of excessive amounts of fluoride.[21,22] A grain-of-rice-sized amount of fluoridated toothpaste is appropriate for children younger than 3 years of age, while no more than a pea-sized amount is recommended for children ages 3 to 6 years.[22] Numerous clinical trials have confirmed the anticaries effect of professional topical fluoride treatments, including 1.23% acidulated phosphate fluoride ([APF]; 1.23% fluoride), 5% sodium fluoride varnish ([**NaFV**]; 2.26% fluoride), 0.9% difluorosilane varnish ([DFS]); 0.1% fluoride), 0.09% fluoride mouthrinse, and 0.5% fluoride gel/paste.[23-25] For children under the age of 6 years, 5% NaFV in unit doses (which reduces the potential

ABBREVIATIONS

AAPD: American Academy of Pediatric Dentistry. **NaFV:** Sodium fluoride varnish.

for harm by limiting fluoride availability) is the only recommended professionally-applied topical fluoride agent.[25] Professional fluoride products are intended for application by, or under the direction of, a licensed dental or medical care provider who is familiar with the child's oral health status and can determine the need and frequency for application based upon a completed a caries risk assessment.[25]

Some parents and caregivers are concerned about their child receiving fluoride and may refuse fluoride treatment even though fluoride is safe and effective.[26] This is similar to opposition to community water fluoridation.[27] Topical fluoride refusal and resistance may be a growing problem and mirror trends seen with vaccination refusal in medicine. Oral health promotion through patient education resources and social media may assist in addressing parental reluctance or misinformation about fluoride.

Policy statement

The AAPD

- recognizes that drinking fluoridated water and brushing with fluoridated toothpaste twice daily are the most effective methods in reducing dental caries prevalence in children.
- encourages toothbrushing with appropriate amounts of fluoride toothpaste twice daily for all children.
- endorses and encourages the adjustment of fluoride content of public drinking water supplies to an optimal level (0.7 ppm) where feasible.
- encourages professionally-applied fluoride treatments for all individuals at risk for dental caries.
- supports the delegation of topical fluoride application to auxiliary dental personnel or other trained allied health professionals by prescription or order of a dentist after a comprehensive oral examination and caries-risk assessment or by a physician after a dental screening and caries-risk assessment have been performed.
- endorses the use of fluoride supplements according to established American Dental Association[9], American Academy of Pediatrics[10], and AAPD[11] recommendations when fluoride levels in municipal drinking water are suboptimal and after consideration of sources of dietary fluoride and the caries risk of the child.
- encourages dental providers to talk to parents about the benefits of fluoride and to proactively address fluoride hesitance through chairside education.
- encourages dental team members to seek opportunities to provide evidence-based community education on the safe and economical dental caries-preventive benefits of fluoride through municipal water fluoridation.
- encourages the US Food and Drug Administration to require food and beverage nutrition labels to include fluoride content. In the meantime, AAPD encourages manufacturers of all beverages and infant formula to include fluoride concentration with the nutritional content on food labels.
- encourages dental professionals to inform medical peers of the potential of dental fluorosis when excess fluoride is ingested prior to enamel maturation.
- encourages continued research on safe and effective fluoride products.

References

1. American Academy of Pedodontics Liaison with Other Groups Committee. Fluoride. Chicago, IL: American Academy of Pedodontics; 1967.
2. American Academy of Pediatric Dentistry. Policy on use of fluoride. Pediatr Dent 2018;40(6):49-50.
3. American Academy of Pediatric Dentistry. Policy on use of silver diamine fluoride for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry; 2023: 103-5.
4. O'Mullane DM, Baez RJ, Jones S, et al. Fluoride and oral health. Community Dent Health 2016;33(2):69-99.
5. Centers for Disease Control and Prevention. Ten great public health achievements–United States, 1900-1999. MMWR Morb Mortal Wkly Rep 1999;48(12):241-3.
6. Centers for Disease Control and Prevention. Recommendations for using fluoride to prevent and control dental caries in the United States. MMWR Recomm Rep 2001; 50(RR14):1-42. Available at: "https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm". Accessed October 15, 2023.
7. Ran T, Chattopadhyay SK, Community Preventive Services Task Force. Economic evaluation of community water fluoridation: A community guide systematic review. Am J Prev Med 2016;50(6):790-6. Available at: "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6171335/". Accessed March 16, 2023.
8. Iheozor-Ejiofor Z, Worthington HV, Walsh T, et al. Water fluoridation for the prevention of dental caries. Cochrane Database Syst Rev 2015;(6):CD010856. Available at: "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6953324/". Accessed May 23, 2023.
9. Rozier RG, Adair S, Graham F, et al. Evidence-based clinical recommendations on the prescription of dietary fluoride supplements for caries prevention: A report of the American Dental Association Council on Scientific Affairs. J Am Dent Assoc 2010;141(12):1480-9. Available at: "https://jada.ada.org/article/S0002-8177(14)60477-3/fulltext". Accessed March 16, 2023.
10. Clark MB, Keels MA, Slayton RL; Section on Oral Health. Fluoride use in caries prevention in the primary care setting. Pediatrics 2020;146(6):e2020034637. Available at: "https://doi.org/10.1542/peds.2020-034637". Accessed March 16, 2023.
11. American Academy of Pediatric Dentistry. Fluoride therapy. The Reference Manual of Pediatric Dentistry. Chicago, IL: American Academy of Pediatric Dentistry; 2023:352-8.

References continued on the next page.

12. Levy SM, Kohout FJ, Kiritsy MC, Heilman JR, Wefel JS. Infants' fluoride ingestion from water, supplements, and dentifrice. J Am Dent Assoc 1995;126(12):1625-32.
13. Adair SM. Evidence-based use of fluoride in contemporary pediatric dental practice. Pediatr Dent 2006;28(2): 133-42.
14. Berg J, Gerweck C, Hujoel PP, et al. Evidence-based clinical recommendations regarding fluoride intake from reconstituted infant formula and enamel fluorosis. J Am Dent Assoc 2011;142(1):79-87.
15. US Department of Health and Human Services Federal Panel on Community Water Fluoridation. US Public Health Service recommendation for fluoride concentration in drinking water for the prevention of dental caries. Public Health Rep 2015;130(4):318-31.
16. Belotti L, Frazão P. Effectiveness of water fluoridation in an upper-middle-income country: A systematic review and meta-analysis. Int J Paediatr Dent 2022;32(4): 503-13.
17. Cumerlato C, Santos CSD, Rotta RN, Cademartori MG, Corrêa MB. Is professionally applied topical fluoride effective in treating incipient caries? A systematic review. Braz Oral Res 2022;36:e083. Available at: "https://www.scielo.br/j/bor/a/x6cjrMqHFwZ8nYNnTSPY3sc/?lang=en". Accessed May 23, 2023.
18. Singh A, Purohit BM. Caries preventive effects of high-fluoride vs standard-fluoride toothpastes – A systematic review and meta-analysis. Oral Health Prev Dent 2018; 16(4):307-14.
19. Walsh T, Worthington HV, Glenny AM, Marinho VC, Jeroncic A. Fluoride toothpastes of different concentrations for preventing dental caries. Cochrane Database Syst Rev 2019;3(3):CD007868. Available at: "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6398117/". Accessed May 23, 2023.
20. Yu L, Yu X, Li Y, et al. The additional benefit of professional fluoride application for children as an adjunct to regular fluoride toothpaste: A systematic review and meta-analysis. Clin Oral Investig 2021;25(6):3409-19.
21. American Dental Association Council on Scientific Affairs. Fluoride toothpaste use for young children. J Am Dent Assoc 2014;145(2):190-1. Available at: "https://jada.ada.org/action/showPdf?pii=S0002-8177%2814%2960226-9". Accessed January 1, 2023.
22. Warren JJ, Levy SM. A review of fluoride dentifrice related to dental fluorosis. Pediatr Dent 1999;21(4): 265-71.
23. Fernández-Ferrer L, Vicente-Ruíz M, García-Sanz V, et al. Enamel remineralization therapies for treating post orthodontic white-spot lesions: A systematic review. J Am Dent Assoc 2018;149(9):778-86.e2.
24. Manchanda S, Sardana D, Liu P, et al. Topical fluoride to prevent early childhood caries: Systematic review with network meta-analysis. J Dent 2022;116:103885.
25. Weyant RJ, Tracy SL, Anselmo T, Beltrán-Aguilar EJ, Donly KJ, Frese WA. Topical fluoride for caries prevention: Executive summary of the updated clinical recommendations and supporting systematic review. J Am Dent Assoc 2013;144(11):1279-91. Erratum in J Am Dent Assoc 2013;144(12):1335. Dosage error in article text. Available at: "https://jada.ada.org/article/S0002-8177(14)60659-0/fulltext". Accessed January 3, 2023.
26. Chi DL. Caregivers who refuse preventive care for their children: The relationship between immunization and topical fluoride refusal. Am J Public Health 2014;104 (7):1327-33.
27. Melbye ML, Armfield JM. The dentist's role in promoting community water fluoridation: A call to action for dentists and educators. J Am Dental Assoc 2013;144(1): 65-75.