

## **Oh No! Not That Fluoride Question Again!**

**Joyce Fernandes, DDS**

**Co-Chair, Dental Health and Public Information Committee**

Recently, many of us have probably been asked about fluoride either by patients, family or friends. Let's address the "Fluoride" elephant in the room and some commonly asked questions.

### **What is fluoride? Is it an artificial chemical?**

Fluoride is a naturally occurring mineral found in groundwater and our oceans. Trace elements of fluoride can be found in foods like potatoes, raisins, oatmeal, shellfish, and in brewed teas and coffees as the plants absorb the minerals from the soil. (1,2) Since 1945, communities have adjusted fluoride in public drinking supplies as a public health measure to reduce dental caries. The current optimal level is 0.7mg/liter. This concept is similar to adding vitamin D to milk or Calcium to orange juice. Countries like Switzerland, Germany, and Austria add fluoride to salt in place of community water fluoridation. (3)

### **How does fluoride help with dental caries?**

Dental caries is the most common chronic childhood disease in the United States, yet it is largely preventable, with fluoride serving as a proven and effective tool in caries prevention (4). The ADA states that community water fluoridation decreases the incidence of caries by 25% in adults and children and is a cost-effective form of prevention. (5) When administered topically Fluoride's anti-cariogenic action, (community fluoridated water, toothpaste, mouthwash, and varnish), is through three mechanisms: inhibiting tooth demineralization, promoting tooth remineralization and inhibiting plaque bacteria. (6).

### **What fluoride products can I safely use?**

The ADA recommends using toothpastes, mouthwashes/rinses containing fluoride, drinking community fluoridated water, and topical fluoride varnish application. In high caries risk individuals, especially children, individuals with special needs, and elderly patients who are unable to tolerate treatment, Silver Diamine Fluoride has been used to arrest dental decay. Fluoride supplements may be prescribed to children living in non-community fluoridated areas; however, careful review of all other forms of fluoride exposure should be considered prior to prescribing fluoride supplements. (7)

### **Are there non-fluoride alternatives?**

The ADA does not officially recommend fluoride alternatives as substitutes for fluoride, but acknowledges some options for patients who prefer them, such as hydroxyapatite toothpaste for remineralization, xylitol in chewing gum to inhibit cavity-causing bacteria, and chlorhexidine rinses or gels. (8,9) Nutritional counseling on a low sugar/processed foods diet should be a part of all conversations and emphasized even more with patients who prefer non-fluoride alternatives.

### **How much fluoride exposure is there during pregnancy and infant feeding?**

Research suggests that fluoride can cross the placenta and reach the fetus (2,10), though the extent depends on factors such as maternal fluoride exposure, gestational age, and the presence of other environmental factors. (10) A systematic review of fluoride metabolism in pregnant women living in fluoridated versus non-fluoridated areas found that the ratios of fluoride in fetal and maternal plasma or serum were similar, and that irrespective of the levels of fluoride in the water supplies, the levels of maternal and fetal fluoride were exceedingly low, around 0.03ppm F. (1,10)

Human breast milk and cow milk have only trace amounts of fluoride. Manufacturers of infant formula use fluoride-free water in the processing of ready-to-use formulas in the USA and Canada. Thus, the fluoride content ranges from 0.1 mg to 0.3mg/liter, which provides a modest source of fluoride. (11) Using boiled optimally fluoridated water (0.7 ppm F) to reconstitute the powdered infant formula, at around 12 months of age, fluoride ingestion would essentially be the same as the recommended daily fluoride dose of 0.05. (1,12)

Per the CDC, in order to decrease the chance of mild dental fluorosis, bottled water labeled as deionized, purified, demineralized, or distilled that contains only trace amounts of fluoride can be used to reconstitute infant formula. (10) Some bottled water is marketed for infants, with low fluoride levels, for the purpose of mixing with formula. (1,12)

## **Are there any risks associated with Fluoride?**

Risks associated with water fluoridation include very minimal fluorosis. However, there are recent concerns regarding neurodevelopment in children who may consume elevated levels of fluoride. Presently, there is no data showing intelligence quotient (IQ) differences or emotional and behavioral development in children residing in optimal fluoridated water versus non-fluoridated communities. (10,12). There is some misconception regarding community water fluoridation that is being quoted from studies done in China and India, which have higher levels of naturally occurring fluoride in the water. When additional fluoride was added to the already naturally existing levels of fluoride in the water, it amounted to 1.5 mg/liter versus the optimal recommended amount of 0.7 mg/liter. This is almost double the optimal recommended level of 0.7 mg/liter of fluoride in water! (13, 14) And thus, appears to be a preliminary risk for neurodevelopmental differences when fluoride levels exceed the recommended 0.7mg/liter.

Studies done in countries with similar backgrounds to the US, such as Spain, New Zealand, Canada, and Australia, found no impact on IQ. (13, 14, 15) Community water fluoridation varies in different parts of the world - most of Australia, Canada, and Ireland have community water fluoridation. However, the Canadian city of Calgary had removed fluoride from its water supply in 2011, but residents recently voted to reinstate it after a decade of increased dental problems and 78% higher need for hospital dentistry for children. In Juneau, Alaska, children enrolled in Medicaid experienced an average increase in cavity-related treatment costs of 47% within nine years of discontinuing fluoride in the water. (12).

## **Does Virginia have community fluoridated water?**

Virginia ranks among the top six states in the country in terms of the proportion of the population receiving fluoridated water from community water systems, with more than 95 percent of Virginians receiving fluoridated water. (16) As of June 2025, Luray and Timberville ceased community water fluoridation citing cost-effectiveness. (17)

## **What are the dental associations and other organizations doing to raise awareness?**

The ADA, AAPD, AAP and WHO have issued statements in support of community water fluoridation. (18). The ADA also has a "Fluoridation Facts" page on its website to help patients make informed, autonomous decisions about their oral health care. (19)

I hope this review is helpful in your daily interactions with patients. For more information and resources/references and citations, please refer to the NVDS Fluoride landing page: <https://www.nvds.org/general-public/oral-health-topics>

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