Fluoride: From Birth to Adolescence

Tooth decay is one of the most common chronic diseases among children in the United States, and affects between 60-90% of school-aged children, particularly those in lower socioeconomic groups (Tham et al., 2015). In general, poor oral health can result in pain, infections, and tooth loss, which can negatively impact childhood quality of life (Chou, Cantor, Zakher, Mitchell, & Pappas, 2013). Fortunately, tooth decay is preventable! Fluoride is an essential mineral that helps strengthen tooth enamel and prevent cavities, especially in children (American Dental Association [ADA], 2014). In this article we will discuss the benefits of using fluoride, the most common concerns about fluoride intake in children, and recommendations from birth to adolescence.

Benefits of Fluoride

The most important benefit of fluoride is its association with improved dental health. More specifically, sufficient fluoride intake is associated with lower cavity rates in nearly every population, from infants to the elderly (ADA, 2014). Fluoride intake during the formative years of tooth development is linked to better overall tooth health as well as improved long-term tooth strength (ADA, 2014). The reduction in cavities will also reduce the need for fillings and tooth removal, which consequently reduces dental costs (Center for Disease Control [CDC], 2018). Studies show that preschool aged children who brushed their teeth with a standard fluoride toothpaste had a 24-29% reduced incidence of cavities (dos Santos, Nadanovsky, & de Oliveira, 2013). It is important to keep in mind that fluoride is a preventative measure and not a

treatment for cavities, which is why it is important from a young age (Salas, Nascimento, Huysmans, & Demarco, 2015). If tooth decay or damage has occurred it will not be remedied with additional intake of fluoride (Salas et al., 2015).

Sources of Fluoride

Fluoride is found naturally in the environment in water and food sources, supplements, as well as in dental hygiene products (Kanduti, Sterbenk, & Artnik, 2016). Most freshwater has a small amount of naturally occurring fluoride with a concentration of 0.01-0.3 parts per million, which is not sufficient to provide protection against cavities. As of 2015, the U.S Public Health Service recommendation is that water has a fluoride concentration of 0.7 ppm or mg/L (U.S. Department of Health and Human Services [USDHHS], 2015). For this reason, many parts of the United States have introduced fluoride into the water supply in order to increase consumption; however, there are many areas in Utah that do not have fluoridated water despite the research and recommendations supporting the practice (CDC, 2018).

Recommendations

Current recommendations from the World Health Organization and Center for Disease Control are focused on providing fluoridated water and toothpaste to children (Petersen & Lennon, 2004; CDC, 2018). Fluoride needs vary with age and are different for children and adults (Wong et al., 2010). Table 1 includes the recommended concentrations of fluoride toothpaste to use with children of various ages. Before supplementing, it is beneficial to know the fluoride levels in the water you consume regularly. This can be done with home tests or, visit “My Water’s Fluoride” at https://nccd.cdc.gov/DOH_MWF/Default/Default.aspx on the CDC website. This can give you the best idea of the baseline amounts being ingested and whether additional supplementation is needed to reach the recommendations. Under the Affordable Care Act, insurance companies will cover preventative dental care for children, including fluoride treatments (HealthCare.gov, 2019). Talk with your child’s dentist or pediatrician if you have questions.

Table 1: Recommended Use of Fluoride Toothpaste

(Kanduti et al., 2016; Wright et al., 2014).

Age	Recommendations	Fluoride Concentration
Birth-6 months	• Not applicable	Not applicable
6 months – 2 years	• Brush 2x daily with just water • If advised by a dentist, brush with a smear of fluoridated toothpaste	None up to 500 ppm
2-6 years	• Brush 2x daily with a pea sized amount of fluoridated toothpaste	1000 ppm
6 years and over	• Brush 2x daily with a peanut sized amount of fluoridated toothpaste	1450 ppm

Table 2. Extended Information on Recommendations of Fluoride and Dental Health

Age	Recommendations
Birth to 6 Months	• Supplementation is not necessary, as breast milk contains enough fluoride to meet needs (Tham et al., 2015).

Age	Recommendations
	• Studies show that children who are breastfed up to 12 months of age have a lower risk of developing cavities (Tham et al., 2015). • Teeth typically do not erupt until about 6 months of age, so brushing is not necessary.
6 Months to 2 Years Old	• Children should visit a dentist every six months to ensure their teeth are healthy and to prevent dental complications (AAPD, 2019). • The ADA recommends that parents brush their children's teeth with only water until two years of age in order to reduce risk of fluorosis (Wright et al., 2014). • If parents choose to use toothpaste at this age, they should consult first with their dentist (ADA, 2014). The United States Department of Health and Human Services (USDHHS) recommends using a small smear of fluoridated toothpaste the size of a grain of rice (Wright et al., 2014).
2 Years to 6 Years Old	• Children should be encouraged to brush their teeth twice a day with a pea sized amount of fluoridated toothpaste (Kanduti et al., 2016). • Teach children to spit out toothpaste instead of swallowing it while brushing so excess fluoride is not ingested (AAPD, 2019). • If living in an area where the water supply is not fluoridated, supplementation of fluoride is often advised by dentists and pediatricians (ADA, 2014). • Dentists can apply fluoride topically through varnishes, gels, and foam products (AAPD, 2019). • Fluoride products available for home use include toothpastes, mouth rinses, drops, gels, and pastes (AAPD, 2019).
6 Years up to 13 Years Old	• As permanent teeth grow in, fluoride intake and overall oral health should be monitored carefully to ensure the development of strong permanent teeth (AAPD, 2019). • Children should be encouraged to brush their teeth twice a day with a peanut sized amount of fluoridated toothpaste to protect the tooth enamel (AAPD, 2019). • Children may begin to use fluoride rinses, which can increase fluoride exposure (Kanduti et al, 2016).
13 Years up to 18 Years Old	• Throughout these years, teeth will become fully grown and require continued maintenance and protection. • Consistent use of fluoride toothpaste throughout adolescence and into adulthood will continue to protect teeth from decay and cavities (AAPD, 2019).

For more information on dental health in children and adolescents, talk with your pediatric dentist or visit the American Academy of Pediatric Dentistry and the American Dental Association websites.

Concerns with Excess Fluoride

The most common concern with excess fluoride is fluorosis, or visible damage and changes to the tooth enamel (USDHHS, 2015; Kanduti et al., 2017). Fluorosis occurs as a result of overexposure to fluoride in the first six years of life, when the process of tooth mineralization and enamel formation are occurring. Milder forms of fluorosis appear as lacy white marks on the teeth and discoloration, while more severe forms of fluorosis can result in pitting in the teeth (USDHHS 2015). Fluorosis can result from misuse of dental hygiene products and from drinking excessive amounts of fluoridated water in addition to supplementation (Kanduti et al., 2017). Using fluoride treatments as directed by a dentist or physician can prevent these issues from occurring. Fluoride poisoning can also occur if dental products are misused or overconsumed. The probable toxic dose level is defined as being 5 mg of fluoride per kilogram of bodyweight consumed (Kanduti et al., 2017).

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