

Fluoride Supplementation

Up-to-date information for the health care professional



Oral Health in Wisconsin — A Fact Sheet

Introduction

Community water fluoridation has long been recognized as the most efficient and cost-effective method of providing recommended levels of fluoride for the prevention of dental caries. Fluoride supplements have been proven to cause significant caries reductions in children living in suboptimally fluoridated areas.

It is Essential that the Fluoride Content of the Patient's Drinking Water be Determined Prior to Prescribing Fluoride Supplements.

Primary Sources of Fluoride Consumption

Residence Water: If patient is drinking community water, the fluoridation status should be known. Is the community water fluoridated to optimal levels (0.7 parts per million for Wisconsin)? Is the community water naturally fluoridated above 0.6 parts per million? If the community water is deficient in fluoride, what is the natural level? If patient is drinking independent private well water, the water should be tested for natural fluoride content.

School and Day Care Water: Determine if child's primary source of water is at school or day care.

Bottled Water: Most delivered domestic water and water obtained from stores contain insignificant amounts of fluoride. However, some brands do contain levels of fluoride that would affect the supplement dosage schedule. Bottled water products that are marketed as purified, distilled, deionized, demineralized or produced through reverse osmosis typically have fluoride levels much lower than those products marketed without these claims. There is no federal requirement to display the fluoride content on the bottles label unless fluoride is specifically added to the water.

Dietary - Breast Milk or Infant Formula: Breast milk has very low levels of fluoride. Concentrated formula (powdered and liquid) contains very low concentrations of fluoride. An infant on concentrated formula receives fluoride almost exclusively from the water that is mixed with the formula. The fluoride content of the water used to reconstitute the formula must be known. The practitioner must determine the proportion of bottle-feeding and reduce or eliminate the supplement accordingly. Significant changes in feeding patterns, such as breast-feeding to bottle-feeding or solid foods may need supplement adjustment.

Dietary - Solid Foods: Most infant foods contain low levels of fluoride, although some contain appreciable amounts. Foods and juice prepared with fluoridated water can be expected to contain fluoride. However, the intake of solid foods reduces fluoride absorption to about 60% of intake.

Questions and Answers

When are Dietary Fluoride Supplements Needed?

Practitioners are encouraged to evaluate all potential sources of fluoride before prescribing fluoride supplements. Dietary fluoride supplements may be needed when drinking water supplies have inadequate amounts of fluoride. Children who live in areas without adequate natural fluoride in individual home water supplies, in communities that have not yet adopted water fluoridation, or who primarily consume unfluoridated bottled water or water filtered with a reverse osmosis system may need a dietary fluoride supplement.

How do Dietary Fluoride Supplements Benefit Children's Teeth?

Exposure to low levels of fluoride to the outer tooth surface leads to a decrease in the incidence of dental caries (tooth decay) in both primary (baby) and permanent teeth. Therefore, the benefits of dietary fluoride supplements can last a lifetime. Dietary fluoride tablets provide a topical effect to erupted teeth when the tablet is dissolved and swished before swallowing. Some of the fluoride is taken up by dental plaque, some is transiently present in saliva, and some is loosely held on the enamel surfaces. Consumption of dietary fluoride supplements provides low levels of fluoride throughout the day.

What Forms of Dietary Fluoride Supplements are Available?

Dietary fluoride supplements are provided by prescription in liquid or tablet forms as fluoride drops, fluoride tablets or lozenges, fluoride-vitamin drops, fluoride-vitamin tablets, and oral rinse supplements. Most fluoride supplements available in the U.S. contain sodium fluoride.

When Should Dietary Fluoride Supplements be Started?

The greatest benefits occur if dietary fluoride supplements are taken each day throughout childhood, starting at 6 months of age.

When Should Dietary Fluoride Supplements NOT be Used?

Dietary fluoride supplements should not be used in areas where there are adequate levels of fluoride in the drinking water. Prior to prescribing fluoride supplements, the fluoride content of the water consumed by the child needs to be evaluated. The current dosage schedule recommended by the American Dental Association (ADA) and American Academy of Pediatrics should then be used to determine the correct dosage for each fluoride supplement prescription. The ADA recommends that children at low caries risk should not be given dietary fluoride supplements but instead should consider other sources of fluoride for caries prevention.

Should Infants Who are Breast-fed AND Live in a Fluoridated Area Receive Fluoride Supplements?

Practitioners may wish to consider supplements for infants who are breast-fed and live in a fluoridated area. Caution should be applied, however, in prescribing supplements to these children. Introduction of additional baby foods at early ages is well documented with as few as 10% of infants breast-fed exclusively for as long as 4 months. Frequent contact with the mother is required to ascertain changes in feeding habits and strict instructions concerning discontinuation of supplements if additional foods or fluoridated water are added to the diet. Studies of the efficacy of fluoride supplements given for short periods to breast-fed children living in fluoridated areas suggest limited caries reductions. Therefore, many dental public health professionals do not believe fluoride supplements are necessary for infants who are breast-fed and live in a fluoridated area.

How do you Determine the Appropriate Supplement Dosage for a Child Who Consumes Significant Amounts of Water From Sources That Differ in Their Fluoride Concentration?

For children who consume water from sources that differ in their fluoride concentrations, a determination of the "effective" concentration should be made whenever possible. The "effective" concentration is the weighted average of the water concentrations. It is calculated by multiplying the fraction of the average total daily water intake from each source by the fluoride concentration at that source and adding the results. For example, assume that the fluoride concentration of the home water supply is 0.1 ppm and that water accounts for 50% of the average total daily water intake ($0.1 \text{ ppm} \times 0.50 = 0.05 \text{ ppm}$) and that the school or child-care facility water supply has 1.0 ppm fluoride and 50% of the water intake is from that source ($1.0 \text{ ppm} \times 0.50 = 0.50 \text{ ppm}$). In this case, the "effective" water fluoride concentration would be: $0.05 + 0.50 = 0.55 \text{ ppm}$. The prescription for dietary fluoride supplementation should be based on the "effective" concentration of 0.55 ppm, not on the 0.1 ppm concentration of the home water supply.

Are There any Advantages or Disadvantages with Prescribing Fluoride-Vitamin Supplements?

Fluoride-vitamin supplements are as effective in preventing dental caries (decay) as fluoride supplements alone. If vitamins are indicated for a child living in an area with a suboptimal concentration of fluoride in the water, the fluoride-vitamin combination can be beneficial for that individual. However, the fixed formulation of a fluoride-vitamin sometimes makes it difficult to adjust the supplemental fluoride intake for concentrations of fluoride already in the water. Therefore, extra care

should be taken when prescribing fluoride-vitamin supplements to ensure the proper level of fluoride is being provided. In addition, care should be taken to continue fluoride supplements after the need for the vitamins are discontinued.

How Should Dietary Fluoride Drops be Given to a Young Child?

Infants and young children should be given dietary fluoride supplements in liquid form, as fluoride drops or fluoride-vitamin drops. The drop(s) may be placed on the tongue and swallowed or added to the child's beverage. If the latter method is used, the fluoride should be given with water or juice, but not with milk, which tends to bind fluoride ions and slow absorption.

When Should a Young Child Switch From a Drop to a Tablet Form of a Dietary Fluoride Supplement?

The young child should use dietary fluoride drops until he/she can master dissolving and swallowing the tablet. Professionals recommend that drops be continued until age two or possibly age three.

At What Time of Day Should the Dietary Fluoride Supplement be Taken?

It is very important to have the child take the dietary fluoride supplement daily at a convenient time. A routine time, such as bedtime should be chosen and adhered to so that the fluoride supplement is taken each day.

When Should the Dietary Fluoride Supplement Prescription be Changed?

The prescribed dose of the fluoride supplement should be monitored to ensure that the child is receiving adequate amounts of fluoride. The dosage may need to be changed when:

1. An infant in a fluoridated area consumes anything in addition to breast milk;
2. An infant in a fluoridated area consumes anything in addition to "ready-to-feed" formula;
3. A child reaches age three and age six;
4. There is a change in the source of the child's drinking water.

When Should Dietary Fluoride Supplements be Discontinued?

Dietary fluoride supplements provide a systemic source of fluoride to teeth, including second molars, as they develop before eruption. In addition, if dietary fluorides are allowed to dissolve in the mouth before being swallowed, they provide a topical source of fluoride, which benefit the teeth that have already erupted. The American Academy of Pediatrics and the American Dental Association recommend the use of fluoride supplements until age 16.

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References

1. American Dental Association. 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. JADA 2010, Vol. 141(12).
2. American Dental Association. Evidence-based clinical recommendations regarding fluoride intake from reconstituted infant formula and enamel fluorosis: A report of the American Dental Association Council on Scientific Affairs. JADA, 2011, Vol. 142(1).
3. Arizona Department of Health Services. Fluoride Supplementation-for the Life of Your Practice: A Resource Guide.
4. Kula, K. and Wei, S.: Fluoride Supplements and Dietary Sources of Fluoride. In Clinical Uses of Fluorides. Edited by S.H.Y. Wei. Philadelphia, Lea & Febiger, 1985.
5. Cowles, K. Center for Disease Control, Atlanta, GA. Personal Communication.
6. Levy, S. University of Iowa, Iowa City. Personal Communication.
7. Workshop Report. Dietary Fluoride Supplements. J Dental Research 1992; Vol 71 No 5: 1226.