AMERICAN ACADEMY OF PEDIATRICS

Committee on Nutrition

Fluoride Supplementation: Revised Dosage Schedule*

Since the previous Committee on Nutrition statement on fluoride was issued in 1972,[1] the value of providing fluoride supplements to help prevent dental caries has been supported by a growing body of experimental evidence.[2] This statement has been prepared to recommend a new dosage schedule that decreases the dosage of fluoride in infancy and that is better adjusted to the concentration of fluoride in the drinking water.

Health authorities agree that, in communities where the fluoride concentration of the water is suboptimal, the most effective and inexpensive means of reducing dental decay is by adjusting the community water supply to an optimal fluoride concentration. In the absence of a fluoridated central water supply, alternative means of fluoride supplementation should be used. Fluoride in tablets, drops, lozenges, or in combination with vitamins can serve this purpose and have been shown to be effective.[2] However, the success of these forms of fluoride supplementation depends on whether parents are sufficiently motivated to supervise the regular, daily intake of fluoride supplements by their children from shortly after birth until about 16 years of age. It should be emphasized that fluoride administration is strictly supplemental; it is intended to increase fluoride intake in approximately the amount that would be obtained from fluids in optimally fluoridated communities. Fluoride intake is primarily from water and liquid foods made with fluoridated water. There is relatively little fluoride in most foods[3-5]; exceptions are certain seafoods.

*It is our assumption that, by the time of publication, no commercial formula will be manufactured with fluoridated water.

Dosage

In establishing an optimal dosage regimen for fluoride supplements, the age of the child and the existing fluoride concentration in the water supply are the two major considerations.

Age. The dosage schedule included by manufacturers of fluoride supplements in their package information has been that recommended by the Committee on Nutrition of the American Academy of Pediatrics in 1972.[1] In communities where the water supply contains less than 0.5 ppm of fluoride, the Committee recommended 0.5 mg of fluoride daily for children from birth to 3 years of age, and 1 mg of fluoride for those over 3 years of age. In communities where the fluoride concentration of the water supply was greater than 0.5 ppm, no supplementation was recommended. This dosage regimen has produced very marked decreases in incidence of dental caries.[2,6,7] However, there has also been evidence of moderate fluorosis of the enamel in a few children.[6-8] Although the fluorosis may fade to some extent with time,[9] it suggests an intake that is at the borderline of the cosmetically acceptable limit. On the basis of these findings, a lower dosage schedule is now recommended.

Several different dosage schedules of fluoride supplements have been suggested since 1972.[10-13] The dental profession largely accepts the dosage schedule now recommended by the Council on Dental Therapeutics of the American Dental Association (ADA).[14] According to this schedule, in communities with less than 0.2 ppm of fluoride in the water supply, the recommendation is 0.25 mg of fluoride daily between birth and 2 years of age, 0.5 mg between 2 and 3 years of age, and 1.0 mg after 3 years of age. The basis for the brief period of age 2 to 3 years for the 0.5-mg dosage is to some extent historical. It was believed that changes from previous recommendations were

warranted only on the basis of clinical evidence.[15] Thus, only below the age of 2 years was there considered to be sufficient evidence to recommend a dose below 0.5 mg to reduce the possibility of mild fluorosis.

The dosage schedule recommended by the ADA Council on Dental Therapeutics provides less fluoride for children under 2 years of age than was previously recommended by the American Academy of Pediatrics. This should virtually eliminate the chance of enamel fluorosis that results from excessive fluoride. Also, the dosages more closely parallel changes in body weight during infancy and childhood,[16(p20)] an advantage because it is assumed that fluoride requirements are related to body weight.

Two aspects of fluoride supplementation that have engendered considerable discussion are the requirements of breast-fed infants and the use of fluoride during the first six months of life. Because breast-fed infants frequently consume little or no water, it has been suggested that they receive fluoride supplements whether or not they live in optimally fluoridated communities.[17] Breast milk, like cow's milk, contains very little fluoride, even in fluoridated areas.[18] However, the frequency of caries was found to be identical in a study comparing infants who were breast-fed with those who were fed powdered cow's milk formula diluted with naturally fluoridated water.[19] Other studies in naturally fluoridated communities also suggest that the fluoride obtained, after weaning, from an optimally fluoridated water supply is sufficient to decrease the prevalence of caries in permanent teeth.[16(p6),20,21] These studies do not completely answer the contention that the prevalence of caries might be further reduced by providing fluoride to breast-fed infants during a period when their fluoride intake might otherwise be particularly low and when mineralization of unerupted teeth is taking place. This issue is not of paramount importance when breast-feeding is only maintained for a few months; however, with more than six months of exclusive breast-feeding, fluoride administration seems advisable.

In respect to formula-fed infants, some physicians have suggested that fluoride supplementation should not start until 6 months of age because variations in feeding regimens complicate the selection of an appropriate dosage.[22-25] On the other hand, it is argued that supplementation should start shortly after birth because the period of mineralization of unerupted deciduous teeth includes early infancy.[2,26] In weighing these opposing views, the Committee favors initiating fluoride supplementation shortly after birth in breast-fed infants (0.25 mg/day) and according to the fluoride content of the drinking water in formula-fed infants, in the expectation that this would have a beneficial effect during a period of active mineralization of bone and teeth, and because starting a regimen in early infancy might facilitate long-term compliance. Nevertheless, the Committee recognizes the basis for the view that satisfactory reduction in prevalence of caries can be accomplished by initiating fluoride supplementation as late as 6 months of age.

TABLE I

SUPPLEMENTAL FLUORIDE DOSAGE SCHEDULE (MG/DAY*)

Age	*Concentration of Fluoride in Drinking Water (ppm)*		
	<0.3	*0.3-0.7*	*>0.7*
2 wk-2 yr	0.25	0	0
2-3 yr	0.50	0.25	0
3-16 yr	1.00	0.50	0

*2.2 mg sodium fluoride contains 1 mg fluoride.

Existing Fluoride Concentration in Water Supply. Unless the dosage of supplemental fluoride is adjusted in accordance with the concentration of fluoride in the drinking water, there is a possibility of developing enamel fluorosis of the permanent teeth.[7,27] Therefore, the ADA Council on Dental Therapeutics[14] has recommended the following regimen for children 3 years of age or older, based on the total recommended dosage of 1 mg/day. If there is 0.2 ppm of fluoride in the water, the prescribed dose would be 0.8 mg/day; with 0.4 ppm in the water supply, 0.6 mg/day would be prescribed; and with 0.6 ppm in the drinking water, the prescribed dose would be 0.4 mg/day. The recommendations of the Committee on Nutrition are similar to but not as precisely adjusted to the fluoride in the water supply as those of the Council. The Council's regimen is relatively complicated because it does not coincide with the dosages available in tablet form and would require the use of liquid preparations, even in older children.

Revised Dosage Schedule

The newly recommended dosage schedule (Table) allows for the differences in age and in fluoride concentration of community water supplies. It is relatively simple and accommodates both fluoride drops and the commercially available tablets providing 0.25, 0.5, and 1.0 mg of

fluoride as such or in combination with vitamins. For infants who are unable to chew and swallow a tablet, it is recommended that a fluoride solution be dispensed, with an appropriate dropper, starting at about 2 weeks of age.

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