

Systemic Fluoride Supplementation in an Academic Family Practice Setting

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Dental caries remains a major health problem for children¹ despite a recent decline in caries rates among children in the United States and other developed countries.² This decline is thought to be due largely to the frequent use of fluoride products, both in systemic and topical forms.³ Because the appropriate use of fluoride is still the public's best defense against dental caries,⁴ "each pediatric patient should receive the benefits of a form of systemic fluoride"⁵ as well as topical fluoride in the form of fluoridated toothpastes, fluoridated mouthrinses, home fluoride gels, and fluoride treatment in the dentist's office.⁶

Community water fluoridation long has been recognized as the most efficient and cost-effective method of providing the recommended levels of systemic fluoride for the prevention of dental caries.^{7,8} Up to 65 percent caries reductions have been reported. However, approximately one half the population of the United States does not have access to optimally fluoridated water.⁹

For those children who do not drink optimally fluoridated water, the use of systemic fluoride tablets and drops is an effective and safe means of reducing by up to 60 percent the occurrence of dental caries in children.¹⁰⁻¹³ Proper use of systemic fluoride supplements has been advocated in nonfluoridated areas, especially in private practice settings.^{5,14} Before prescribing fluoride supplements, it is essential that determinations of the fluoride content of the major sources of drinking water be obtained for each patient to determine the proper dose and to avoid unnecessary risks of dental fluorosis.⁵ Ingestion of systemic fluoride supplements at doses greater than recommended has been shown to produce observable levels of fluorosis.¹¹ For patients on community water systems, this information likely is available from the water companies. For many patients, however, especially those with individual (well) water supplies, it will be necessary to determine the fluoride content by assay of the patient's drinking water.

After determination of the fluoride content of a patient's drinking water, Table 1 should be consulted to determine appropriate supplement dosage. This schedule is recommended by the American Academy of Pediatrics,¹⁵ the American Dental Association,¹⁶ and the American Academy of Pediatric Dentistry. Because of evidence that there is an increased amount of fluoride available in the food chain, further research is necessary to determine whether adjustment of the recommendations is indicated.¹⁷

Several studies have investigated the extent to which fluoride supplements have been prescribed by physicians and dentists in the United States.¹⁸⁻²⁵ The majority of providers prescribed fluoride supplements for some of their child patients. Studies also have shown that the numbers of water samples submitted for fluoride assay were small in comparison with the numbers of births in nonfluoridated areas.²⁶⁻²⁹ Thus, many providers prescribe fluoride supplements without obtaining prior specific knowledge (by fluoride assay) of the patient's water fluoride content.²⁴ In addition, some providers have been shown to be unaware of the proper dosage considerations, recommended regimen, and contraindications to supplementation.¹⁸⁻²⁵ Only one of these studies evaluated fluoride supplementation in an academic medical setting.³⁰ Because few children visit the dentist before the age of 4 or 5 years and because systemic fluoride is most beneficial before the age of 6 years during a child's early tooth-formative years, physicians have a key role in dental caries prevention.^{7,31}

The purposes of this study were to investigate fluoride supplement knowledge levels, sources of information, and prescription practices among family physicians in an academic medical center. The study was designed to determine whether further education and training concerning fluoride supplementation practices were warranted in the academic setting.

METHODS

In January 1986 questionnaires concerning fluoride supplementation and stamped, return envelopes were sent to

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TABLE 1. SUPPLEMENTAL FLUORIDE DOSAGE SCHEDULE* (in milligrams of fluoride per day)

Age of Child	Fluoride in Water Supply (parts per million)		
	0.3	0.3 to 0.7	0.7
Birth to 2 yr**	0.25	0	0
2 to 3 yr	0.50	0.25	0
3 to 13 yr**	1.00	0.50	0

* Recommended by the Council on Dental Therapeutics of the American Dental Association, by the Committee on Nutrition of the American Academy of Pediatrics, and by the American Academy of Pediatric Dentistry

** The American Academy of Pediatrics recommends providing supplementation from 2 weeks of age through at least 16 years of age

TABLE 2. SOURCES OF INFORMATION REGARDING FLUORIDE SUPPLEMENTATION (percentages of respondents who listed each source as either their primary or a secondary source)

Source	Percent
Medical literature	72
Medical school curriculum	60
Other physician	35
Specialty training program	34
Pharmaceutical company	32
Dentist	23
Lecture at scientific meeting	17
Other	9
Have not received any information	14

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all 48 family physicians affiliated with the University of Iowa Department of Family Practice. A second mailing was sent to nonrespondents after three weeks. All 11 faculty, 15 of 24 residents, and 11 of 13 affiliated private family physicians who attend weekly departmental seminars responded for an overall response rate of 77 percent. Both closed-ended and open-ended questions were used.

RESULTS

All faculty prescribed systemic fluoride supplements, although generally less than once per month. Approximately one fourth of the residents and private physicians did not prescribe supplements at all, but those prescribing were likely to be prescribing at least once per month.

One third of the respondents were uncertain of the approximate percentage of their child patients residing in areas with optimally fluoridated water. Fifty-seven percent reported 80 percent or more of their patients received optimally fluoridated water, 3 percent reported 40 to 59 percent received optimally fluoridated water, and 6 percent reported 0 to 19 percent received fluoridated water.

The physicians' sources of information about systemic fluoride supplementation are displayed in Table 2. The medical literature, medical school, and specialty training were the most frequently mentioned primary information sources. Medical literature and medical school were the most frequently listed secondary sources, followed by other physicians and pharmaceutical representatives. Almost all faculty listed medical literature, while almost all residents listed medical school. Only 23 percent reported a dentist to be a source of information.

The following results are reported only for those physicians prescribing fluoride supplements. An open-ended question asked what factors or guidelines are considered and what steps are taken in determining appropriate supplement dose, if any, to prescribe. The majority (59 percent) of physicians mentioned fluoridated water, 48 percent reported well water, and 35 percent reported city water. Breast-feeding was listed by 41 percent overall—by none of the private physicians, by 42 percent of the residents, and by 78 percent of the faculty. (Because there are very low amounts of fluoride in human milk, breast-fed babies should be supplemented fully, even when residing in a fluoridated community.³²) Water fluoride assay, patient age, and recommended dosage guidelines each were listed by approximately 20 to 30 percent of respondents. All of these factors are important in supplement dosage determinations.

The majority of faculty and private physicians reported that the child's parents or water fluoride assay results were the most frequent sources of information about drinking water fluoride concentrations, whereas only one third of the residents used such sources. Contacting the local water treatment plant was mentioned by 25 percent of the private physicians, while 25 percent of the residents reported that they contact the local health department for information about water fluoride concentrations. Overall, 43 percent of these family physicians reported performing no water fluoride analyses: 11 percent of the faculty, 28 percent of the private physicians, and 75 percent of the residents.

Fifty-four percent of those prescribing supplements (45 percent of all physicians) reported feeling adequately informed to prescribe systemic fluoride supplements. Faculty and private physicians (70 percent) were twice as likely as residents (33 percent) to feel adequately informed. Grand Rounds at the local hospital, a newsletter, a presentation at a professional meeting, and a medical journal article were selected as the best ways to receive further information about fluorides. The residents were most likely to select the Grand Rounds and newsletter.

COMMENT

This study found that providers affiliated with one academic family practice center could benefit from further

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education and training in the appropriate use of systemic fluoride supplements and water fluoride assay. The faculty responded appropriately more frequently than did the residents. Were a more systematic approach to systemic fluoride supplementation to be used routinely, the faculty likely could help train the residents more effectively.

Because studies also have shown deficiencies in knowledge of supplement protocol among private practicing family physicians, it appears that increased emphasis on proper water fluoride assay and systemic fluoride supplementation is indicated for all family physicians. Both continuing education for established physicians and training in medical school and residency programs should be included. Rigilano and co-workers²⁵ also suggested that greater emphasis on the part of educators was needed during residency training to reinforce proper caries prevention protocol. Academic family physicians should work closely with dentists to develop such programs. Systematic study of curricula on fluoride supplementation in medical schools and residencies nationwide should be coordinated with these efforts.

Family physicians should include fluoride supplementation in their standardized pediatric well-baby protocol. When possible, physicians should begin evaluating future fluoride supplement needs while providing prenatal care. In this way, a parent may learn of the need for and benefits of supplementation before the child is born so that fluoride supplements may be initiated immediately after birth. This approach may improve compliance as well because parents are generally most prevention oriented when considering the needs of a wholly dependent newborn. A team approach to fluoride supplementation and water fluoride assay with delegation of overlapping responsibilities to the physicians, nurses, and receptionists has been shown by Messimer and Hickner³⁰ to facilitate this process. Such efforts should be coordinated with the patient's dentist to ensure a smooth transition of responsibility from the physician to the dentist as the patient gets older.

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