Canadian Dental Association Information Sheet

Fluorides and Dentistry

This information sheet, for dentists and members of the dental team, is an update of an earlier version sent to CDA members in November 1999. Its purpose is to provide background on the use of fluorides in dentistry and public health, and interpret CDA policy in light of recent studies focusing on the use of fluorides in dentistry. This interpretation is provided based on what is known at this point in time. It may be amended as new information comes to light.

**Question 1:** **Who is responsible for the regulation of fluorides in Canada?**

**Answer 1:** Health Canada regulates the marketing of medical devices, materials and pharmaceuticals in Canada to assure their efficacy and safety. Products containing fluoride used by consumers and in dentistry fall within its regulatory purview. The Federal-Provincial Subcommittee on Drinking Water, affiliated with Health Canada, makes recommendations on fluoridation of municipal water supplies. Municipal governments determine whether local supplies will be fluoridated. The dental profession, however, recognizes an obligation to provide general information on preventive and therapeutic materials used in dentistry, including fluorides.

**Question 2:** **What are fluorides?**

**Answer 2:** Fluorides are ionic compounds of the element fluorine (F). Fluorine is found in nature only in combination with other elements. An example of such a compound substance is sodium fluoride (NaF). Fluoride compounds are very common and occur in the oceans (at a concentration of about 1 part per million), the earth’s crust, and fresh water supplies in many areas. When we talk about fluorides in dentistry, we are really talking about the effect of the fluoride ion, which is released by these compounds.

**Question 3:** **Why are fluorides important in dentistry?**

**Answer 3:** Fluorides are important as a source of fluoride ions. Scientific literature verifies that fluoride ions reduce cavities in children and adults. Fluoride compounds providing fluoride ions can help repair early dental caries even before signs of decay become visible. When used effectively, fluoride compounds are a powerful preventive agent. In fact, the U.S. Centers for Disease Control and Prevention recently named fluoridation of municipal water supplies one of the 10 most successful public health measures of the 20th century.

**Question 4:** **How is the fluoride ion which prevents decay provided?**

**Answer 4:** Fluoride ions are provided mainly through fluoride compounds in drinking water,
toothpastes, mouth rinses, supplements (lozenges, tablets, drops) and fluoride gels which are applied during a visit to the dental office.

**Question 5:** How does the fluoride ion work to prevent decay?

**Answer 5:** There are three ways in which the fluoride ion acts to prevent decay. First, and most importantly, it actually helps the remineralization of tooth enamel that has been demineralized by acids. Second, it makes teeth stronger by acting on dental enamel and making it less soluble and more resistant to acids. Fluoridated water and products such as fluoridated toothpaste provide the fluoride ions that make this remineralization possible. Third, it reduces the ability of dental plaque to produce the acids that contribute to the decay process.

Topical delivery of fluoride occurs whenever the teeth are bathed in a fluid or material containing an appropriate amount of fluoride ions. Fluoride is provided systemically whenever it is swallowed. Recent evidence indicates that fluoride applied topically is more effective for caries reduction than fluoride taken systemically, even when the individual is exposed to both sources. It is the predominance of the topical effect that explains the life long benefits of water fluoridation.

**Question 6:** If the systemic delivery of fluoride (ingestion) plays a smaller part in preventing tooth decay, why continue to use it?

**Answer 6:** Systemic delivery is the only possible way to incorporate fluoride into developing teeth before they have erupted. The integration of fluoride into developing enamel may provide longer protection than topical application after enamel has been fully formed. However, even fluoride delivered systemically (water fluoridation and fluoride supplements) is most effective topically. Saliva and plaque acquire fluoride from systemic sources. The fluoride continually bathes the teeth and works topically to protect against decay. Systemic fluoride is considered most useful prior to the eruption of all the permanent teeth for those individuals who are at high risk for caries.

**Question 7:** Why then has CDA recently reduced the recommended levels of fluoride in its Considerations on Fluoride Supplementation?

**Answer 7:** CDA’s Considerations on Fluoride Supplementation document attempts to reflect the fact that fluoride is currently available from a variety of sources. Fluoride supplementation has traditionally been defined as tablets, drops and lozenges which individuals chew and swallow. When these supplements were first introduced, fluoride was not easily available in many locations. Today, foods and beverages manufactured in communities with fluoridated water and distributed in non-fluoridated areas extend fluoride protection outside of the fluoridated area. This is known as the halo effect. It multiplies the potential sources of fluoride
exposure and may reduce the need for supplements. This contributes to the need for a more careful assessment of the individual patient.

There is recent evidence that the prevalence of dental fluorosis among children is increasing. With dental fluorosis, a child’s teeth become marked with lines or specks of white enamel. Most dental fluorosis is mild and barely visible. Moderate to severe cases can be unsightly, and may require cosmetic treatment. It means that a child has been exposed to more fluoride than is strictly necessary for the prevention of tooth decay. Part of the increase in prevalence of dental fluorosis may be attributable to increased detection and reporting. However, in response, CDA has not only reduced its recommended levels of fluoride supplementation three times within the last decade, but has also suggested that supplementation be used to protect only individuals or groups living in unfluoridated areas and at special risk for dental caries. CDA also notes that a recent report to Health Canada’s Medical Services Branch by Dr. D. W. Lewis, entitled Fluoride Supplements: Review, Comments, Recommendations, states that “there is a need to objectively reassess, in a scientific and comprehensive manner using a multi-disciplinary team, all aspects of the current need for, and future use of supplements in Canada.” CDA supports such an evidence-based review.

**Question 8:** If fluoride is available from many sources and the prevalence of dental fluorosis among children is increasing, why does CDA continue to support water fluoridation?

**Answer 8:** Fluoridation of drinking water has been a tremendously successful public health measure, and over the years, the dental profession has worked hard to extend the preventive benefits of this measure. Dentists have personally witnessed improvements in the oral health of their patients as a result of water fluoridation.

CDA has continued to support fluoridation of drinking water (at minimum levels required for efficacy as recommended by the Federal-Provincial Subcommittee on Drinking Water) as a public health measure. CDA recognizes that public health measures commonly address a broad population even though related benefits may not apply to everyone in equal measure.

Currently, the value of water fluoridation for some members of the general population is being questioned. Need is becoming more “individual” and more difficult to define in terms of whole communities. In fact, a recent report on fluoridation prepared for the Ontario Ministry of Health and Long-Term Care states “The effect of fluoridation tends to be more pronounced in the deciduous [primary] dentition. The effect tends to be maximized among children from the lower socio-economic groups so that this section of the population may be the prime beneficiary ... More research is needed to document the benefits of fluoridation to adult and elderly populations.”
Accordingly, while definitive evidence of associated risk is lacking, an ethical dilemma is developing with respect to water fluoridation as a public health measure. The dilemma centers on the fact that in today’s world, only a portion of the general population (rather than the whole) may have a high level of need for such a measure. While it is still fair to say that most derive some benefit and few are disadvantaged, the community must openly make a value judgment (as it has always done) in deciding for or against water fluoridation.

Communities are encouraged to review their individual circumstances carefully and in detail, giving attention to any available data on the dental health of community members, the size of the group not likely exposed to adequate fluoride from other sources, the minimum level of fluoride required to be beneficial, and any other information which would be helpful in making the required value judgment.

CDA emphasizes the importance of monitoring levels of fluoride introduced into water supplies to ensure that targets are consistently met and not exceeded. As well, CDA has noted the reduced levels being recommended by the Federal-Provincial Subcommittee on Drinking Water. CDA encourages further research to assess minimal levels which can maintain effectiveness while taking into account the wider availability of fluoride and the prevalence of dental fluorosis. Research supporting the efficacy of smaller concentrations of fluoride could help maintain the value of water fluoridation as a public health measure for disadvantaged children while minimizing the possibility of fluorosis for those least at risk for dental caries.

Finally, CDA is also concerned that significant changes to any single major source of exposure to fluoride (such as community water fluoridation) could have significant regional, provincial or national effects (as distinct from isolated impact on the local community). Fluoridation of the water supply for the city of Toronto, for example, means that manufactured foods and beverages using the city water supply currently contribute to the halo effect referred to above. Research is required to document and define the role of such sources of overall exposure to fluorides prior to concluding that water fluoridation is no longer playing an essential role for the general population.

**Question 9**: Does the availability of fluoride from a variety of sources make it difficult to determine how much additional exposure a patient requires (beyond what he or she is receiving as a consequence of residency, diet and oral health regimens)?

**Answer 9**: Yes it does. CDA emphasizes that the need for fluoride depends upon overall exposure. For example, the dentist attempts to roughly estimate overall exposure as well as likely risk for caries prior to prescribing fluoride supplementation. This is not an easy task.