Water fluoridation

Many communities worldwide lack sufficient natural fluoride in their drinking water to prevent caries. Because of the powerful benefits of the right amount of fluoride, water fluoridation programmes (Box 2) have been established in many countries since the 1930s when its ability to reduce dental caries was first recognized.

Table of contents

Box 2: What is a fluoridation programme?

A fluoridation programme is the artificial and controlled addition of a fluoride compound to a public water supply, in order to adjust its fluoride concentration to an optimal level for prevention of dental caries. The optimal level is usually around 1mg/litre. A fluoride-containing chemical is added to increase the total (raw water plus dosed) level to the pre-determined concentration. The chemical is chosen for its ability to dissolve in water, low cost and lack of undesirable side effects. Fluoride is odourless and tasteless, so there is no perceptible change to the water. The usual chemicals used for fluoridation are: hexafluorosilicic acid, disodium hexafluorosilicate or sodium fluoride. Fluoridation is carried out at water treatment works. A fluoridation programme requires good maintenance and a specially designed plant: fluoridation chemicals are corrosive in concentrated form and must be stored and handled according to safe working practices.

Water fluoridation in low fluoride-containing water supplies helps to maintain optimal dental tissue development and dental enamel resistance against caries attack during the entire life span. Fluoride in drinking water acts mainly through its retention in dental plaque and saliva. Frequent consumption of drinking water and products made with fluoridated water maintain intra-oral fluoride levels. People of all ages, including the elderly, benefit from community water fluoridation. For example, the prevalence of caries on root surfaces of teeth is inversely related to fluoride levels in the drinking water: in other words, within the non-toxic range for fluoride, the higher the level of fluoride in water, the lower the level of dental decay. This finding is important because with increasing tooth retention and an aging population, the prevalence of dental root caries would be expected to be higher in the absence of fluoridation.

Fluoridation of water supplies, where possible, is the most effective public health measure for the prevention of dental decay. Water fluoridation is a multi-professional activity in which engineers, chemists, physicians, nutritionists and dentists all play important roles. The efficiency of fluoridation programmes, and their acceptability to the communities, depends on the general state of dental health and whether there is good access and attendance for free dental health care for children and young people, as well as high standards of diet and oral hygiene.

The consensus among dental experts is that fluoridation is the single most important intervention to reduce dental caries, not least because water is an essential part of the diet for everyone in the community, regardless of their motivation to maintain oral hygiene or their willingness to attend or pay for dental treatment. In some developed countries, the health and economic benefits of fluoridation may be small, but particularly important in deprived areas, where water fluoridation may be a key factor in reducing inequalities in dental health.