

'Section 11 Paragraph 5. The RDC will give formal notice of the appeal or application, and of its eventual decision, to the FPC, LMC, LPC and any doctor or pharmacist whom the FPC had informed on its decision on rurality. The FPC, the LMC and the LPC will have 30 days from the date on which notification of the appeal or application was sent to them in which to submit representations to the RDC. The RDC will determine the appeal or application in whatever manner it thinks fit and its determination will be final; there is no right of appeal to the Secretary of State on rurality. Any area which the RDC determines on appeal to be rural in character will be a controlled locality and any area which it determines not to be rural in character will not be, or will cease to be, a controlled locality.'

Well, that couldn't be clearer . . . could it?

Homeward bound

As I drove my grandfather back to the airport I saw that he held in his hand his notepad. Throughout the week he had from time to time written with his meticulous hand some detail or other. As we drove, he looked at the cover and

leafed through the pages.

'You know, Grandfather, what you have seen this week is just a small part of Jet Age general practice. Certainly we need to know about the sophisticated investigations and treatment techniques so that we can provide the best for our patients. But general practice is more about people and their people than all the science in the world. I like to think that we keep modern techniques and procedures in perspective. Science does have its place but it has to stay in the traditional triad of history, examination and special tests. That has not changed in your lifetime and I do not think that it will change in mine.'

And so it was that my grandfather gave his presidential address to the island medical society of his home. The title was 'General practice in the Jet Age' (or 'History, examination and special tests'). Curiously, the title in parentheses was the title of his doctorate thesis in 1922, and no one had heard of jets then.

Reference

1. *The NHS (General Medical and Pharmaceutical Services) 1983. Amendment regulations. Statutory instrument no. 313.*

CONTROVERSY

Fluoridation update

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In the past, the fluoridation debate has been noted more for its tremendous emotionalism than for its scientific accuracy and objectivity. Recently however, fluoridation enthusiasts are hearing a new attack on their long-held position by reputable scientists who have raised a number of important questions which have been published in some highly respected journals.¹

FORTY years ago it must have seemed a superbly simple idea. Just add a small amount of a cheap chemical called fluoride to a community water supply and Hey Presto! A costly and ubiquitous disease, tooth decay, is controlled and perhaps in time even eradicated.

Recent research however has shown that tooth decay amongst children has declined dramatically in the last ten years even in areas with almost no fluoride in the drinking water.² The differences between rates of tooth decay in areas with different fluoride levels in the drinking water are now very small and almost insignificant. Thus the usefulness of water fluoridation must be evaluated in light of this new research. Additionally, individuals are increasingly exposed to fluorides in processed foods and beverages, dental health products and medicines as well as insecticide, pesticide and fertilizer residues; and, because of growing industrial pollution of the atmosphere with fluoride emissions, even the air they breathe.

Fluoride toxicity

Fluoride can be harmful; and with so many possible sources of fluoride ingestion the risk of overdosage is obviously real. Moreover, recent reviews of the subject suggest that fluoride toxicity may have been underestimated.³

Two questions are being raised in the medical and dental literature with increasing regularity:

1. Are some individuals now ingesting too much fluoride from a growing number of everyday sources?
2. At what concentrations in the body can fluoride damage enzyme systems, cells and organs?

A considerable research effort is now underway worldwide, in an attempt to answer these questions. Meanwhile, many knowledgeable scientists no longer believe that water fluoridation will lead to major improvements in dental health in areas where use of fluoridated toothpaste is prevalent, and where dental health care is readily available.

The margin between an apparently safe, and a harmful dose of fluoride is impressively small. Therefore the notion that if a little fluoride is good then more must be better is not only wrong but dangerous. The tendency to search for more and more ways of increasing exposure to fluoride should be discouraged.⁴ Indeed, the ten members of the Quebec Government Committee of Inquiry into Fluoridation stated in 1979 that there has been 'a substantial increase in fluorides in water, in food and in the atmosphere. In the circumstances, the Committee is of the opinion that an additional amount of fluoride would be not only useless

but dangerous. In other words, we should be more concerned about possible intoxication than with deficiencies of fluorides.⁵

And D. H. Leverett of the Eastman Dental Center, New York, while still endorsing the concept of fluoridation warned that 'the widespread use of fluorides may have created a situation in which we are approaching a critical mass of fluoride in the environment.'⁶

Past and present

Fluoride has held centre-stage in dental research for more than 50 years. In 1931, three different teams of scientists announced their discovery that the primary cause of the widely occurring tooth defect known as 'mottled enamel' was an excessive intake of fluoride during the period of tooth development.⁷ Shortly afterwards, the apparent preventive action of naturally occurring fluoride in drinking water on decay was investigated and brought to the attention of the dental profession and health authorities.⁸ In 1945, the first experimental artificial fluoridation trials started in two towns in America; Newburgh, NY, and Grand Rapids, Michigan. Preliminary reports from these trials seemed to indicate that with minimal effort and no essential change in diet, tooth decay could be reduced by about 60 per cent.⁹

The prospect of extending such an enormous dental benefit to hundreds of millions of people worldwide was breathtaking, and on 1 June 1950 the US Public Health Service started a vigorous campaign to promote fluoridation.¹⁰

Today, while less than 5 per cent of the world's population drinks artificially fluoridated water⁵, fluorides are widely used in dentistry and personal dental care. In fact fluoride compounds are now incorporated in toothpastes, mouth rinses and a variety of dental filling materials: gels, varnishes and paints are used both in the surgery and the home to apply fluoride to teeth: fluoride drops, tablets and vitamin supplements are regularly prescribed; and even fluoride impregnated tooth-picks and dental floss can be purchased in some pharmacies and supermarkets.

Children and fluoride

The first principle of pharmacology is to administer the *minimum* dose for effectiveness; and this applies to fluoride just as much as to any other substance used to influence a human physiological process. The original pioneers of fluoridation envisaged that the daily consumption of one litre of water containing one part per million fluoride would provide the recipient with a 'controlled' dose of 1 mg fluoride. In those early days, self-medication with fluoride in toothpaste or tablets was frowned upon because of the danger of overdosage.

The problem today is how can the recommended 'optimum daily dose' of fluoride be achieved, especially for young children, when *total* fluoride intake can be derived from an indeterminate number of everyday sources?

More than 90 per cent of toothpaste now sold contains high concentrations of fluoride. Today, tooth-brushing is common even among pre-school children; and about 75 per cent of children use toothpaste by the age of 18 months.¹¹ Researchers have shown that children under three years old are incapable of rinsing their mouths effectively due to poorly developed swallowing reflexes. Therefore youngsters may swallow appreciable amounts of toothpaste. In fact, a pre-school child may swallow between 0.3 and 0.4 gm of toothpaste at each brushing. Since most pastes contain fluoride at a concentration of 1,000 parts per million, a daily intake in excess of 0.5 mg fluoride from this source alone is common.¹²

Too much fluoride ingested by young children while their permanent teeth are developing will lead to *dental fluorosis* or 'mottled teeth'. This condition has usually been seen as a cosmetic problem of questionable significance. However, recent studies have shown that dental fluorosis is an indication of toxic effects on mineralization processes in the body.¹³ The abnormal mineralization of the tooth enamel results in the visible mottling of the teeth, while other abnormalities in bones are not readily visible, although detectable by histological methods.

In 1977, The US National Academy of Sciences advised that the retention of just 2 mg fluoride per day by the individual would lead to *skeletal fluorosis* after 40 years.¹⁴

Side effects

Dental fluorosis and skeletal fluorosis are universally recognized symptoms of overexposure to fluoride; but the question of whether fluoride can cause genetic damage is still to be resolved. However, commenting on a recently discovered property of fluoride, the 'New Scientist' noted, 'Thus some of the serious charges that are being laid at its door—genetic damage, birth defects, cancer and allergy response—may arise from fluoride interference after all.'¹⁵

And Dr John Emsley, whose team discovered this 'new' property of fluoride has written, 'But a warning bell has sounded: through the agency of the strong hydrogen bond, fluoride can change the chemistry of many compounds. What it may be capable of doing in the living cell, whether for good or ill remains to be discovered.'¹⁶

Forty years ago, artificial fluoridation appeared a simple, safe and attractive idea. Today however, when there are so many other sources of fluoride intake, the mass medication of total populations with fluoride via the reticulated water system would appear not only unnecessary, but inadvisable. Already in the countries of continental Western Europe, after many years trial in some cities, all except three small fluoridation plants have been closed down, so that less than 1 per cent of the population is now fluoridated.

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