



November, 8 and 9, 2004

PROCEEDINGS

Coordinator

Prof. Dr. Marília Afonso Rabelo Buzalaf

IL 1- FLUORIDE INGESTION AND RISK OF DENTAL FLUOROSIS

Brian Burt

Professor, Department of Epidemiology School of Dentistry, University of Michigan, USA.

Current recommendations on fluoride intake from the Institute of Medicine's National Research Council in the United States are that the "adequate intake" level is 0.01 mg/day for infants up to 6 months old, and for all ages above 6 months it is 0.05 mg F/kg/day. The "adequate intake" level for a 70 kg adult male is 4 mg/day and for a 52.5 kg adult female it is 3 mg/day. These advisory levels have stood for some years now, but there are some problems with their derivation. For one thing, it is not clear just what these levels of intake are meant to be adequate for: presumably it is for caries prevention in children and for healthy bone in adults. The source for these recommendations is also obscure, and there is reason to believe they could partly be based on questionable data. Their history goes back to McClure in 1943, when he estimated that the "average daily diet" for children up to 12 years contained 0.05 mg F/kg body weight/day. A range of 0.05-0.07 mg F/kg body weight/day was quoted as the "optimum level" in 1980, and it has stood as a guideline since then. Related to these Dietary Reference Intakes is the maximum permissible level of fluoride in drinking waters, currently set at 4.0 mg/L by the Environmental Protection Agency. The reasoning behind this level is that when fluoride is present at a higher concentration the EPA considers that the risk of skeletal problems becomes too high. This figure too has seen some changes over time. Establishing cause-and-effect for fluorosis from dietary fluoride intake is a difficult field of study, though some good information has come from the longitudinal Iowa study of fluoride intake in childhood related to fluorosis development in later childhood. Susceptibility to fluorosis is likely to vary from one individual to another, though this issue has not been studied.

IL 2- THE METABOLISM AND TOXICITY OF FLUORIDE

Gary M. Whitford

Professor, Department of Oral Biology Medical College of Georgia, USA.

The metabolic characteristics of fluoride (F), including its absorption, tissue distribution and excretion, are involved in both its beneficial and unwanted effects. Typically 80-90% of an ingested amount of F is absorbed from the gastrointestinal tract. High dietary concentrations of certain cations, especially calcium, can reduce the extent of absorption. Upon entering the blood, F is rapidly distributed throughout the extra- and intracellular fluids of soft tissues. Brain and adipose tissue have the lowest F concentrations. Calcified tissues, including dentin and enamel, have the highest concentrations and contain 99% of the F in the body. The rate of F uptake by bone is greatest during growth. The excretion of F occurs almost entirely via the kidneys. The renal clearance of F is positively related to urinary pH. Thus, a high-protein diet reduces F excretion while a vegetarian diet increases F excretion. The amount of F in bone and, therefore, in the body can be reduced by increasing its fecal excretion (eg, high dietary calcium) and by increasing urinary pH.

An acute F dose as small as 5 mg/kg of body weight may cause serious toxicity. It is not possible to achieve this dose level from optimally fluoridated water. Several dental products commonly found in the home, however, contain enough F to exceed that dose level if they are ingested in sufficient amounts. The only known unwanted effect of F associated with the long-term ingestion of optimally fluoridated water and the normal use of dental products (eg, dentifrices and dietary supplements) is enamel fluorosis which can occur only during the pre-eruptive development of the teeth. Claims of harm from the long-term ingestion of optimally fluoridated water, such as cancer, bone abnormalities, kidney problems and mental retardation, have not been verified by well-conducted studies.

IL 3- DENTAL FLUOROSIS: IS THERE A REASON FOR PREOCCUPATION?

William Bowen

Welcher Professor Emeritus of Dentistry, Chair The Center of Oral Biology, School of Medicine and Dentistry University of Rochester, USA.

Scientists have noted an association between mottled enamel and fluoride exposure since the early 1900s. By the mid-1900s, they also recognized that fluoride intake was related to lower caries incidence. To harness the protective effect of fluoride while limiting the occurrence of fluorosis, dental researchers have recommended that the fluoride level in drinking water be 1 part per million or less. Despite the recognition that fluoride levels in water can be controlled to offer caries protection with minimal risk of fluorosis, the cosmetic defect continues to appear. However, although the word “fluorosis” conjures up images of brown stained and pitted enamel, such severe cases rarely are seen in the United States. Children in this country are exposed to fluoride from numerous sources and the appearance of mild fluorosis is not unusual. In most cases, fluorosis is a minor cosmetic defect that should not be cause for alarm. Dentists should educate their patients about the optimal range of fluoride intake for caries protection, sources of fluoride and the possibility of fluorosis.