

TREATISE ON FLUOROSIS

by AK Susheela^a

Fluorosis Research and Rural Development Foundation, India, 2001

Reviewed by HC Moolenburgh^b

Within a few years after the discovery in the early 1930s that fluoride in drinking water and other sources was the cause of endemic dental mottling and skeletal crippling, the distinguished Danish physician and health officer Kaj Roholm published his landmark treatise, *Fluorine Intoxication: A clinical-hygienic study with a review of the literature and some experimental investigations*.¹ Subsequently, many other books and reviews on the biomedical aspects of fluoride have appeared. Some of these have been directed mainly toward the interests and needs of persons engaged in fluoride research. Others, like my own book,² as well as a copiously documented one now in press,³ are for the more general reader.

Professor Susheela's book, despite its title, falls somewhere between being a strictly technical reference work and a handbook of basic information. Although written primarily to help medical personnel learn how to recognize and take measures to prevent or alleviate fluoride intoxication or fluorosis, her book has very wide appeal. As might be expected, the first part of the book deals with the huge and growing problem of endemic fluorosis in India, which, although of interest to the Western World, is still largely a matter of local concern. But then the book expands to a global scale and clearly sets out the three principal features of fluorosis.

DENTAL FLUOROSIS

This condition is rampant in India. Susheela's color photos are the best I have ever seen. In the Anglo-Saxon world where fluoridation is still practiced, dental fluorosis has become a major problem, as conceded by the recent York review from England.⁴ Hardly an example of impeccable and unbiased evaluation, this report is more of a "save-what-can-be-saved" document. Yet it had to admit that in fluoridated regions 48 percent of the population, on average, has dental fluorosis, with 13 percent in the category of cosmetically objectionable. In the United Kingdom this means that 3 million people have mottled teeth, with three quarters of a million in a moderate to severe form. Far from being "only a cosmetic effect", as promoters of fluoridation like to say, it is far more than that. Susheela rightly says that persons with discoloured teeth develop an inferiority complex and, "in the case of females it can even be an impediment to matrimonial propositions."

^aAvailable from: Fluorosis Research and Rural Development Foundation, C - 103 Saransh, 34 - I.P. Extension, Delhi - 110092, India. Cost including shipping: \$45 USD (outside India) or Rs.375/- (in India). Email for order forms: susheela@ndf.vsnl.net.in

^bHC Moolenburgh: Oranjeplein 11, 2012 LN Haarlem, The Netherlands.

She also deflates the myth that fluoride in drinking water at 1 ppm substantially reduces tooth decay or that the concentration must be above 1.5 ppm to cause problems. She points out that dental fluorosis and caries in India occur in combination and that a fluorosed tooth is a poorly mineralized tooth.

SKELETAL FLUOROSIS

Some of the greatest experts on this form of fluorosis are from India, Professor Jolly of Punjab having been one of the world's most renowned. Susheela rightly states that much of our knowledge about skeletal fluorosis and how it develops has come from India. In Holland during fluoridation in the early 1970s we saw patients with the first stages of skeletal fluorosis, mainly low back pain and pain in the small joints of the fingers. Happily it did not come to gross deformities as shown in Jolly's films and also in this book.

NONSKELETAL FLUOROSIS

Susheela first sums up lesser known facts about this form or stage of fluorosis. Her research on muscle degeneration is especially interesting. Her findings concerning the effect on red blood cell involvement provide a new dimension to our understanding of fluoride intoxication. Membrane degeneration induced by fluoride turns erythrocytes into what she calls "echinocytes" with a shrunken membrane and a much shorter lifespan, capable of causing severe anemia.

She then moves into (for me) an area of more familiar research. During 1972, when part of my own region was fluoridated, I founded a physicians group to examine what we then called the "side effects" of fluoridation. First I trained the doctors to recognize the symptoms with the help of the research reports by Dr George L Waldbott, that outstanding pioneer investigator of nonskeletal fluorosis. These symptoms were of such a general nature that they could be easily overlooked or misdiagnosed (insatiable thirst, gastrointestinal pains, migraine, skin irritation, depression, etc.).

Susheela takes her research one step further. She not only corroborates Waldbott's and our findings, but she uses the gastrointestinal complaints as a method to detect early fluorosis. She uses scanning electron microscopy of gastric and duodenal tissues as an early warning of fluoride intoxication. Her very clear pictures show a "cracked clay appearance" of the mucosa and a "loss of microvilli".

Another warning signal is the abnormal configuration of sperm cells, which could help explain male infertility when fluorosis is present. Although she also mentions neurological involvement, she does not mention erratic and hyperactive behavior in children, a symptom I saw regularly until prescription of fluoride tablets was banned in Holland in 1998.

In accordance with our findings, Susheela reports that the early, non-skeletal stages of fluorosis can be cleared up in about two weeks by giving the patients water with as low a fluoride content as possible. She also offers excellent advice about low-fluoride food because she believes that fluoride intake should be as low as possible.

Without doubt, this book is especially useful for how clearly it describes the origin and nature of dental, skeletal, and nonskeletal fluorosis. Other long-term effects like cancer and coronary involvement are not considered, but it is invaluable for training medical care personnel in how to recognize the symptoms of fluorosis.

REFERENCES

- 1 Roholm K. Fluorine intoxication: a clinical-hygienic study with a review of the literature and some experimental investigations. London: HK Lewis; 1937.
- 2 Moolenburgh H. Fluoride: the freedom fight. Edinburgh: Mainstream Publishing; 1987.
- 3 Groves BA. Fluoride: drinking ourselves to death? Dublin: Newleaf (Gill & Macmillan); 2001.
- 4 McDonagh MS, Whiting PF, Wilson PM, Sutton AJ, Chestnutt I, Cooper J, et al. Systematic review of water fluoridation. *BMJ* 2000;321:855-9.

Dental fluorosis is a condition characterized by noticeable white spots on the tooth enamel that later on develop into severe pits and stains. It is typical among children who consume too much fluoride, either directly or indirectly, while brushing or drinking water. Although it is mainly regarded as a children's condition, Dental fluorosis has also been reported in adults. Dental Fluorosis Risk Factors. Children age 8 years and younger are the common victims of dental fluorosis. This normally happens while their permanent teeth are beginning to develop under their gums. However, this no longer Combating fluorosis on a large scale has remained a dream till now because of absence of massive communication programs, absence of awareness with respect to individuals and so forth. Mass communications or web-based social networking can assume a key part in anticipating and restricting issue of fluorosis. It is apparent from studies by a few specialists worldwide that fluoride in groundwater and sustenance has been a potential issue to human culture. To remediate the menace caused by fluoride, an integrated approach is needed. [26] Susheela A K. (2001). Fluorosis: Indian Scenario: A treatise on fluorosis. Fluorosis research and rural development foundation. New Delhi, India. Dental Fluorosis- A Clinicoepidemiological Review. outer layer of enamel (approximately 50 μ m) owing to diffusion of fluoride from the oral environment (i.e. saliva, ingested materials, dental plaque and therapeutic applications) [38]. The characteristics of fluoride distribution in teeth are a relatively high concentration of 500-4000 mg/kg in surface enamel (approximately 50 μ m) and a lower concentration (50-100 mg/kg) in deep enamel. A Treatise on Fluorosis. 2nd Edition. Delhi, India (2003). Dental Fluorosis Treatment: Four Ways Dental Fluorosis Is Treated. There are a few different ways that dental fluorosis can be treated. 1 " Porcelain Laminate Veneers. One of the most esthetic ways is by placing porcelain laminate veneers over the affected teeth as shown in the picture to the right. The book Dental Fluorosis: A Handbook for Health Workers states the following about this technique, "In reality the improvements in appearance are primarily the result of abrading the outer porous enamel with pumice after it has been partly demineralized by the acid." This procedure may need to be repeated several times to obtain satisfactory results.

fluorosis area. Although overfluoridated drinking water in Isparta was diluted with some non-fluoridated water sources with the object of supplying safe and sufficient water to the entire population, the fluoride levels of some drinking water are still high (2.7 ppm) (Savas et al., 2001). The exact mechanism of the effect of fluorosis on the whole body is still unclear. Some studies suggested that a high level of free radical might play an important role in these effects. The oxidative stress and modification of cellular membranes

Susheela, A.K. and Moolenburgh, H.C. 2001: Treatise on fluorosis. *Fluoride* 34, 181-183. Teotia, M., Teotia, S.P. and Singh, K.P. 1998: Endemic chronic fluoride toxicity and dietary calcium deficiency interaction. Dental fluorosis is caused by ingesting too much fluoride while the teeth are developing. Dental fluorosis discolors the teeth. The staining can range from white flecks to deep brown stains. In this post, I will talk about the various treatments for dental fluorosis. If you're interested in how dental fluorosis occurs and want to see a couple different pictures to see what dental fluorosis looks like, check out my previous article, [Dental Fluorosis: Too Much Fluoride Stains Teeth](#). [Dental Fluorosis Treatment: Four Ways Dental Fluorosis Is Treated](#). There are a few different ways that dental fluorosis is treated.

Fluorosis is an abnormal condition caused by excessive intake of fluorine, as from fluoridated drinking water, characterized chiefly by mottling of the teeth. Moderate level chronic exposure (above 1.5 mg/l of water) is quite common. Long-term ingestion of large amounts can lead to potentially severe skeletal problems (skeletal fluorosis). The early symptoms of skeletal fluorosis include stiffness and pain in the joints. In severe case, the bone structure may change and ligaments may calcify, with resulting impairment of muscles and pain. Acute high-level exposure to fluoride causes immediate

Fluorosis is a cosmetic condition, not a disease. Often, it is so mild that only a dental professional can detect it. Most cases of fluorosis result from young children taking fluoride supplements or swallowing fluoride toothpaste when the water they drink is already fluoridated. Symptoms. Teeth affected by mild fluorosis may show no visible changes or changes visible only to a dental professional. Mild to moderate fluorosis is characterized by white lines, streaks or spots. In more severe fluorosis, the teeth can become pitted and have brown, gray or black spots, and the enamel can be misshapen. Dental fluorosis can be prevented by stopping children from swallowing topical fluoride products such as fluoride toothpaste. Parents should put only one pea-sized amount of fluoride toothpaste on a young child's toothbrush at each brushing. Fluorosis isn't a disease and doesn't affect the health of your teeth. In most cases, the effect is so subtle that only a dentist would notice it during an examination. The type of fluorosis found in the United States has no effect on tooth function and may make the teeth more resistant to decay. Below are four typical cases of mild fluorosis, seen in children participating in the Iowa Fluoride Study. What Can I Do to Prevent My Child From Developing Fluorosis? Dental fluorosis is a common disorder, characterized by hypomineralization of tooth enamel caused by ingestion of excessive fluoride during enamel formation. It appears as a range of visual changes in enamel causing degrees of intrinsic tooth discoloration, and, in some cases, physical damage to the teeth. The severity of the condition is dependent on the dose, duration, and age of the individual during the exposure. The "very mild" (and most common) form of fluorosis, is characterized by small Fluorosis is a condition caused due to higher fluoride levels in your body. It affects the teeth by changing the enamel coating on it and also the bones. Fluorosis " An Update. International Journal of Research in Pharmaceutical and Biomedical Sciences. 2013; 4: 1084-8. Published on Sep 21, 2015. Latest Publications and Research on Fluorosis.

Fluorosis is a condition caused due to higher fluoride levels in your body. It affects the teeth by changing the enamel coating on it and also the bones. Fluorosis – An Update. International Journal of Research in Pharmaceutical and Biomedical Sciences. 2013; 4: 1084-8. Published on Sep 21, 2015. Latest Publications and Research on Fluorosis. Fluorosis is a crippling disease resulted from deposition of fluorides in the hard and soft tissues of body. It is a public health problem caused by excess intake of fluoride through drinking water/food products/industrial pollutants over a long period. Ingestion of excess fluoride, most commonly in drinking-water affects the teeth and bones. It results in major health disorders like dental fluorosis, skeletal fluorosis and non-skeletal fluorosis. People exposed to large amounts of fluoride show dental effects much earlier than the skeletal effects. Dental fluorosis affects children and discol Fluorosis Diagnostic Procedure. Good history retrieval namely : 1. Place of birth, 2. Place of stay, 3. Duration of stay, 4. Source of drinking water, 5. Health complaints, 6. Clinical examination 7. Assess. Fluorosis Diagnosis : Essential Tests. Samples to be tested for fluoride in : Serum, Urine, Drinking water. Do not use KITS. Instead Use :: Ion Selective Electrode technology (reported in mg/L). Sample collection (Precautions). * Body may tolerate ; Less the better. A Treatise on Fluorosis; AK Susheela ; 3rd edn. 2007: Page 64. Evaluation of test reports. Possibility 1 : Confirmed case of Fluorosis All samples (Urine, Serum, Water) = Fluoride beyond normal range X Ray forearm = Calcification of interosseous membrane. Evaluation of test reports. How Widespread Is Fluorosis? Fluorosis first attracted attention in the early 20th Century. Researchers were surprised by the high prevalence of what was called “Colorado Brown Stain” on the teeth of native-born residents of Colorado Springs. The stains were caused by high levels of fluoride in the local water supply. This was fluoride that occurred naturally in the ground water. People with these stains also had an unusually high resistance to dental cavities. This sparked a movement to introduce fluoride into public water supplies at a level that could prevent cavities but without causing fl...