

FLUORIDATION

Although it is not a contagious disease, dental caries or tooth decay presently constitutes one of the most challenging health problems in the United States. 99% of the population of the U.S. has some experience with dental caries before they reach adulthood. Half of the population over 55 years of age have no teeth at all. A health study in Massachusetts showed that the average child in that state at the age of 14 has lost one tooth do to caries and has at least 4 teeth filled with 7 others in need of filling. A survey in California of children ages 5 - 12 showed that 65% had suffered decay of their permanent teeth. In 1969 a survey showed, 2/3 of Head start children across the U.S. were in need of dental repairs, most of these children were less than 5 years of age. Compounding this problem of dental health is a great shortage of dentists, hygenists, and assistants. It has been estimated that approximately 1/3 of the population sees a dentist annually while 18% has never seen a dentist. The dental manpower currently available cannot physically provide for more than 1/2 the existing dental needs.

Various methods of dealing with the problem of dental caries have been advocated over the years. Fluoridation of drinking water is by far the best method suggested.

The history of Fluoridation is <sup>is interesting</sup> that its study evolved not in the problem of tooth decay but in the problem "molted enamel," Before 1920 this developmental hypoplastic staining of the teeth was found to be evident in some areas of this and other countries. In 1916 a dentist, S. McKay of Colorado reported this phenonomen and was convinced it was due to an unknown element in the water supply. 1931 the agent was identified as fluoride. Continuing research showed that dental fluorosis became detectable when fluoride conc. rose over 0.6 ppm, and at conc. of 2 ppm or above, dental fluorosis became an acute and urgent public health problem. Also noted was that molted teeth appeared to be relatively free of dental caries. Research continued on and it became a conclusion that fluoride caused cariostasis and should be incorporated in some way into a public health system and be offered to the masses to fight the on going problem of tooth decay.

Some methods that have been tried include

1. Fluoridated domestic salt.

The drawback here was marketing the salt and trying to find the amount of domestic salt ingested / kilogram body weight and thereby incorporating the required amount of fluoride in the salt. This technique is still being tried in some European cities, the most recent data showed a 28% DMFT reduction. The amount of salt in this test was 250 mg/kg. A new test with 200 mg and 350 mg/kg has been started in 1973 and no results have yet been posted.

2. Fluoridated Milk

This method is being tested in school age children in Glasgow. The project consummated last spring contains 200 children  $4\frac{1}{2}$  to  $5\frac{1}{2}$  year olds. 100 cartons with 1.6 mg fluoride in 200 ml of milk and 100 containing ordinary milk for those acting as controls are distributed daily. This scheme will continue for 3 years at which time the results will be posted.

3. Fluoride Tablets

It has been proven that the fluoride tablet is beneficial, but here we have the problem of supplying the masses and getting good cooperation from the parents.

4. Fluoridated Bread

5. Mouth Rinses

6. Fluoridated dentrifice

7. Self Application of Fluoride

8. Application of Fluoride by the dentist

I could go on with other methods which have been advocated, but the best result have been through the Fluoridation of the public water supply.

It has now been 33 years since the first controlled water fluoridation project were consumated. The year was 1945, FDR had just been reelected to his 4th term as president of the United States, AMA reported the breakthrough for treatment of Typhoid with the new drug streptomgeen, Vitamin K impregnated gum was being pushed as a caries-preventive agent with greater potential than fluoride. Army dental corps reported it had done 71.5 million fillings, 2.6 million dentures,

and 16.5 million extractions since Pearl Harbor, Snead won the 19th annual Los Angeles open, total prize money \$2,666. It was a time when the most popular song was "Don't Fence Me In" and a time when there were no anti fluoridationists to fence us in! What has developed since that beginning? What is the situation today?

In the 1st few years after the induction of fluoride into the water supply in our neighbor city Grand Rapids, reports came of ill effects.

"Since injecting this water I have been gaining weight rapidly", "Bathing in Fluoridated water is causing a rash all over my body." Fortunately these claims were found not to be true. As time went on the opponents to fluoride implicated fluoride as causing every disease known to man, from cancer to baldness, brain lesions to apathy, from sarcoyosis to nymphomania. All, most all claims were checked out by the scientists, except the last two. The author from which I took this excerpt says the investigation of the last two might have been fair and also if the people of Seattle at the time of this 1952 referendum had

known what the 2 words meant "nymphomania and Satyriosis" they might have voted to have a little of that stuff put in their water supply.

One of the most recent complaints of the "anti-flor." is that Fluoridated water is potentially dangerous for use in the hemodialysis patient with artificial kidneys. As usual the evidence did not support the claim, furthermore there is an increasing tendency to use deionized water for this purpose, also stopping the benefits occurring to 80 million people who are now using fluoridated water, so that low fluoride tap water could be substituted for deionized water for an estimated 1,800 patients with artificial kidneys is more ridiculous than banning the free use of salt on behalf of a much larger number of patients with heart disease who must restrict their sodium intake.

Although after 33 years of anti-<sup>Fluoridationist</sup>~~fluoridation~~ with their illusions there is no evidence of their claims being substantiated. Furthermore there is not a case where they have taken the initiative or offered assistance in solving a communities problem where that problem is one of having an excessive conc. of natural fluoride in the drinking water, thereby causing fluorosis!

It was in the period of 55-65 that fluoride advocates ~~had~~ <sup>had</sup> the most series set back and the most frustrating response from a voting public. Fortunately all organizations concerned with protecting health-professional govern., and voluntary - had adopted water fluoride as a safe, ~~and~~ effective and practical public health procedure. Nevertheless it was during this period that the referendum method of determining whether a community should have fluoridated drinking water was actively promoted by the anti-fluor. They knew that the referendum method offered them excellent opportunities to exploit fear and doubt while posing as protectors of human rights and *Religious* freedom. The "anti-fl." won in approximately 2/3 of the 900 public referend~~s~~ held in communities to determine the fate of water fluoride. It was during this period the anti-fl. sought opportunities to engage in debate on the platform, on radio and on T.V. Although public opinion polls showed 70% in favor of public fluoride, community action was not in accord with this finding. Research by social scientists, anthropologists, political scientists, psychologists and socialists concluded that income, education, and general age of communities played a big roll in the

vote. Communities categorized as having higher income and education levels and larger number of children under age 15 voted for fluoride, while those of the other categories, low income, education levels and fewer children under 15 voted against fluoride. ~~As these studies continued these differences became less apparent.~~

Only one nation, the Republic of Ireland has made water fluoridation compulsory. In the U.S. as of 1977, seven states Conn., Minnesota, Illinois, Delaware, Michigan, South Dakota, and Ohio have enacted legislation to require fluoridation of public water supplies. Recently N.J. had a large debate over fluoride<sup>ation</sup> of water supply. The "anti-fl." introduced a bill to take away the authority from the public health council to issue a statewide regulation on fluoridation. The bill was passed by both houses, but the governor vetoed it. My discussion of fluoridation of public water has been largely conc. on the U.S. where more than 70% of the people who now have access to fluoridated drinking water live. The current status in other countries is spotty. In Europe, relatively good progress is being made, in the Netherlands, Chyzislvakia and the United Kingdom.



In the Western Pacific, both Hong Kong and Singapore have Fluoridated drinking water, Progress in Malazia, Austrialia, New Zealand is fairly good. ~~In the~~ <sup>Also the</sup> progress has been good in Canada, Chilá, Panama, and Puerto Rico. / The mechinism of the action of fluoride is as follows: During tooth formation, small amounts of fluoride are incorporated into the enamel in the form of hydroxyfluorapetite which is more resisted to acid dissolution. During this period of pre-eruption matyration, this phenomenon of fluoride incorporation continues in the enamel surface, leading by the time of tooth eruption to a high fluoride content of the surface layer of the enamel. In addition fluoride stimulates the development of a more perfect appetite crystal and a well miniralized enamel.

Following eruption, topical effect of fluoride is important. It's major effect~~ive~~ then is to stimulate the remineralization of the enamel after each short period of enamel dissolution by acids which form on the tooth. These various ways in which fluoride exerts its protective effect lead to the conclusion that exposure to fluoridated water should continue throughout life for maximum preventive benefits.

The maximum preventive benefits of fluoride are seen among persons who have been continuously exposed to fluoridated water from birth, thus including the period when the permanent teeth are forming. The consistency of the level of protection observed is remarkable, averaging about 50%. Some studies have demonstrated reductions in caries incidence as high as 68% in 12 year old children. Benefits to the primary dentition are of a similar magnitude. Protection is also conferred on teeth which are already present in the mouth when fluoridation is begun. One example, 16 year old children who had been exposed to fluoridated water for only 6 years had 41% less caries than those in a control study of non-fluor. water. Caries prevalence among persons examined in the naturally fluoride rich area of Colorado Springs, was approximately 60% lower than in non-fluoridated Bolder, Colorado, through age 44.

The studies have shown that in addition to overall reduction in caries, fluoridation also reduced the number of large cavities which endanger the tooth pulp, and often lead to tooth extraction. The protective effect of water fluoridation is not uniform throughout the mouth. The least susceptible anterior teeth are likely to remain caries free. Pit and

fissure areas of the biting surface of the posterior teeth receive about 30-40% protection whereas the interproximal and gingival surfaces of the teeth show much higher levels of benefit. This is of great importance because restoration of the interproximal and gingival caries ~~is~~ by far a more expensive dental procedure.

The history of fluoridation in this city as near as I could find out is as follows.

It was consumated August 16, 1966. The fluoride is added to our public water supply at the fillteration plant on Lakeshore Drive. It's in the powder form and automatically placed in the system. Average dosage last year was 1.12 ppm , which is optimal, the average cost per milliom gallons is \$1.97.

Some of the other fluoride programs in the county, which are not on public water, are what is called Rinse programs carried on by the public health dentist. It constitutes a weekly visit by either a hygenist or dentist to the county schools, the children are given a cup, with a fluoride solution and are told to "swish" it around in their mouth and spit it back in the cup. Last year the cost of this program was approximately 50¢/ person / year. Some statistics

have shown a 50% reduction in caries in these schools.  
I believe these ~~to~~<sup>to be</sup> incorrect.

In conclusion, from the standpoint of health benefits safety and economics, water fluoridation has been proven to be the single most effective method of reducing the prevalence of dental caries and bringing this costly disease under control throughout the world.

Fluoridation is correctly regarded as one of the most effective public health measures ever instituted. Water fluoridation should be the cornerstone of any national or local program to prevent dental caries. In view of the enormous and consistent body of evidence which has been gathered, and the cost benefits of this method, there no longer exists any valid reasons for failing to make water fluoridation available to every person with access to public water supplies.