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Fluoridated Water: Friend, Not Foe!

Part I: A Look at the Historical Science

The year was 1942; the place was the small town of Bartlett, TX, an hour's drive from Austin; and the situation was brown-stained teeth. The problem was that the brown staining of Bartlett residents' teeth did not come from the obvious cause – smoking and chewing tobacco. This was obvious from the age range of residents who suffered from the problem, as well as another startlingly absent feature of heavy tobacco users: every long-term resident of Bartlett had an unusually low number of cavities, especially when compared to the residents of the neighboring town of Cameron.

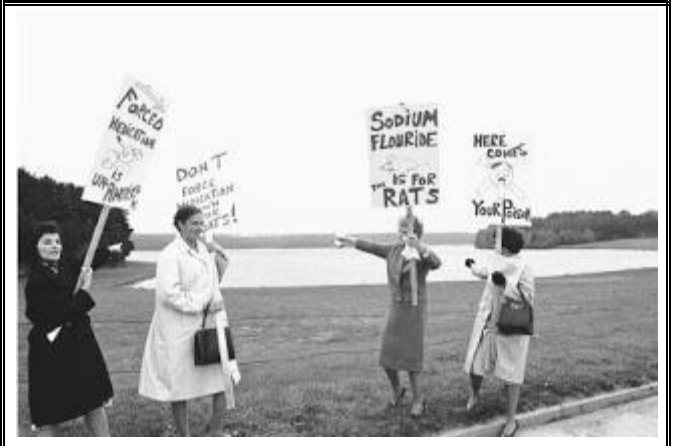
According to historical documents, scientists wondered how two towns, alike in so many ways, could show such startling differences in dental health. They started doing environmental testing, and discovered the answer in the water quality of the two towns. Whereas Cameron water supplies had naturally occurring fluoride levels close to .4 mg/L; Bartlett's levels were significantly higher, reaching levels as high as 8 mg/L – twenty times the amount of naturally occurring fluoride in the next town over…and quite possibly toxic at such levels. These findings prompted investigators to do a contrast study between the long-term residents (> 15 years of residence) of each town to see if there was any serious long-term health problems associated with fluoride ingestion, and if the benefits of dental protection outweighed the dangers; the results were surprising.

Medical tests of the time were not nearly as advanced as they are today, but even then X-Rays showed that people who regularly drank water fluoridated at Bartlett's levels showed a higher rate of bone malformation. Over the years since, advanced testing has shown that regular consumption of water fluoridated at levels over 4 mg/L is toxic to humans and can cause cardiac damage and osteo ailments;

however, back in 1942, the news that fluoride could be used as an oral preventative against cavities was groundbreaking. Further testing was done to find the optimal level of fluoride – the most protection for the least level of damage – and it was found that levels of 1 mg/L would prevent cavities without damaging internal organs or bone development. In 1953, Grand Rapids Michigan became the first municipality in the United States to add fluoride – in the form of sodium fluoride; a white, dissolvable powder – to its public drinking water. Back then, as of now, not everyone was happy with that decision.

Part II: Present Day Protests

Fast forward to the present day, 2012; the state of Rhode Island has a problem with copper and lead pipes used for some municipal and many residential water lines. The problem is that pipes made of copper or lead are from a bygone era when health and environmental protections were not as prevalent as they are today. Consequently, older houses still have drinking water pipes made from corrodible heavy metals that seep into the drinking water of the people who live in these older homes – mostly working class families who rent and have no say in the matter, or who own but cannot afford to update their housing infrastructure.



Circa 1953. Prior to use as a water additive, concentrated sodium fluoride was used as rat poison. Photo courtesy of ScienceClarified.com

Rather than focus on this visible – and expensive to rectify – health threat, activists instead prefer to focus on the issue of fluoride additives, believing that these additives, *combined with metal pipes*, are the culprit of drinking water based ills; that fluoride does little good for and much harm to the human body. These activists insist that fluoride – now an almost universal additive to municipal reservoirs – is a dangerous chemical responsible for the rise on osteoporosis, heart disease, and other serious ailments that start to show as the human body ages. As a science major and a woman, I felt it my academic duty

to investigate these claims further. Is my drinking water leading me down the path of osteoporosis and heart disease?

From a scientific point of view, the arguments against fluoridation of water are hypothetical; while the science behind them is proven, no peer-reviewed study has conclusively shown a causal link between municipal water fluoridation (at current levels) and serious ailments. However, little recent research has been published on this topic by peer reviewed, scholarly journals – the standard of accepted scientific thought. Defending this lack of research is anti-fluoridation supporter Robert*, a Rhode Island Libertarian who believes that the government has gone way to far for way too long in determining how Americans can live their lives.

"The reason no major, mainstream studies have not been done is because all of those studies are sponsored by the government or Big Pharma, both which prefer to keep fluoridating the water. Why would they sponsor research that would prove that they are putting poison in our water so they can put money in their pockets?"

Poison? Could this be true; or is it the fodder of Internet conspiracy theory?

Part III: Interviews With the Experts

According to RI Department of Health Chief Sanitarian Frederick Kurdziel, municipalities that fluoridate water do "regular testing" to determine the amount of naturally occurring fluoride in water before adding additional fluoride, which ionizes, diluting its toxicity. *Toxicity? How toxic is it? Can fluoride harm me after all?* Fluoride is a tricky chemical. In order to react, chemical and environmental conditions must be exact; specifically, one of three metals must come in contact with the [ionized] fluoride: mercury, silver, or lead. Seeing as all of these heavy metals are inherently dangerous to human health in their singular state, made more so when reacted with high fluoride levels, municipal water sources with too much naturally occurring fluoride are closed off from public consumption (private wells do not fall under these government regulations).

So if fluoride levels in municipal water are guaranteed safe for human consumption, why do some consider fluoridated water dangerous? Because the chemical reaction between fluoride ions and heavy metals found in water (mercury and lead especially) does not occur on a miniscule scale in your mouth; it occurs on a larger scale, while the drinking water is still in the reservoirs; storage tanks; and sitting in the pipes, ready for use as soon as the faucet is turned. Depending on where your water is stored and for how long, there may be a large amount of toxic impurities still in it when it streams out of your tap.

Kurdziel shares, "As water sits, it reacts. After six to eight hours of sitting overnight [in municipal and residential lead pipes], water in the tap is going to test positive for high lead levels. If you go on vacation for two weeks and turn on the tap when you return, your lead levels are going to be sky high" regardless of the fluoride levels in the water. Kurdziel continued with the advice to "let your water flush" before use to remove the portion that may have been contaminated in the line. By doing this any particles of contaminate will be washed out of the water lines before they can be consumed and the benefits of fluoride will still be accessible. Weighing the pros and cons (Kurdziel admits that this practice is "not every environmentally friendly") begs the question of how important fluoride really is. Are we sacrificing our environmental health at the cost of minimal return to our personal health?

Unless you have PVC pipes,
this is probably what your plumbing lines look like

According to Lynn Virgilio-Caron, a Registered Dental Technician, "Fluoride is single handedly probably responsible for the prevention of most decay. Studies have proven over and over that the right amount of internally ingested fluoridated water during tooth development makes the enamel much more

decay resistant by actually being incorporated into the enamel structure. This cannot be achieved by topical fluoride. [Fluoridated municipal water] is a public service, and by the way, has declined in effectiveness since most children drink bottled water." Virgillio-Caron has the American Dental Hygienists' Association (ADHA) on her side; according to this organization, "Fluoridation of community water has been credited with reducing tooth decay by 50% - 60% in the United States since World War II".

Part IV: Studies, Secondary Interviews, and Shoddy Science

Studies show that these dental health experts are correct; it appears that fluoride is a friend after all! According to the Centers for Disease Control, fluoride ingested in small amounts will offer its cavity preventing properties as it washes through the mouth before eventually being excreted from the body through natural toxin processing by the liver – unless, of course, there is too much fluoride or other fluoride-based impurities for the liver to process; at that point, theoretically speaking, problems can arise. It is these problems that concern anti-fluoridation activists. One of them is Jessica Shippee Moone, a mother of two whose elder daughter, Amber, developed the same benign condition that affected residents of Bartlett, TX – dental fluorosis.

"I used fluoride water for Amber's formula and she ended up getting too much and now has dental fluorosis and the dentist said it's from that. He said (and I got a second opinion that was in agreement with the first) that formula should not be made with fluoride water because there is so much of it in everything nowadays."

It should be noted that Shippee did not say that her pediatrician recommended fluoridated water for baby formula. The fact of the matter is that exclusive use of fluoridated water is not recommended for babies who are exclusively bottle fed due to an increased possibility of dental fluorosis. According to the Centers for Disease Control website, "parents can use low-fluoride bottled water some of the time to mix infant formula; these bottled waters are labeled as de-ionized, purified, demineralized [sic], or

distilled." (Side note: Look for water stored in BPA free plastic bottles). The CDC continues to recommend limited amounts of fluoridated products for children aged birth to eight years as a precaution against dental fluorosis and accidental fluoride overdose. This, however, does not appear to be a reason to stop fluoridating water when, especially since the CDC has ruled municipal water fluoridation "one of ten great health achievements of the 20th century". Its right up there with vaccinations – another controversial subject, I know, and one for a different article.

To recap, fluoride in appropriate amounts is both safe and beneficial; nevertheless, among activists, there are continued concerns about fluoride poisoning. One activist is Tonya Goodell, an overall organics enthusiast, who after an interview emailed me a study, published on Health-Science.com, which she feels proves her reasoning for "avoiding fluoride [and] taking boron to rid my body of fluoride". According to Goodell's source, Health-Science.com, fluoride poisoning is a serious, on-going problem that should not be ignored.

The article Goodell sent me cited a Chinese study on which Health-Science USA's website reported. Study participants who consumed fluoridated water – "some of which were within the range of total intake reported for fluoridated areas of the U.S. and Canada" – were noticed to suffer "not only adverse effects on teeth and bones but also those involving soft tissues [including] evidence of increased fractures, poor fracture healing and bone outgrowths". Unfortunately for science, this article buries the fact that the water fluoride levels consumed by the study participants were, for the most part, much greater than fluoride levels considered safe by the CDC. Furthermore, the study in question did not focus *solely* on water fluoridation; the *actual* purpose of the study was to show the correlation" between poor diet, *especially calcium deficiency*, repeated childbirth and the duration of exposure to the severity of the effects of chronic fluoride poisoning." [Italics added]. This report by Health-Science.com offers shoddy reporting at best; at worst a deliberate and manipulative twisting of fact to support a particular point of view.

Part V: Making the Case for Fluoride

So how much fluoride is too much? Here in America, the CDC has found that the average human can consume and process up to 4 mg/L of fluoride at one time; according to Kurdziel, the CDC recommends that water be fluoridated at levels not exceeding .7 mg/L. To put this in a layman's perspective, 1 mg/L of fluoride amounts to a 1 square inch area of concentrated fluoride for every 16 square miles. Of course, fluoride does not concentrate in one area of a drinking water system (Kurdziel assures me that there are safety precautions in place to prevent this from happening). Rather, the fluoride is spread evenly throughout the system to ensure that the citizenry is not overdosing.

But what if you drink the recommended eight eight-ounce glasses of tap water a day? Even at the rate of .7 ppm, that would be 5.6 ppm of fluoride ingested over the course of a day! At this rate, Americans should be showing the effects of excess fluoride consumption, shouldn't they? Ann Durham, Water Quality Specialist for the town of Franklin, MA, explains exactly why this is not happening: "Your body has the ability to process impurities. [With regard to fluoride poisoning] a person would have to drink in excess of six liters of fluoridated water in one hour in order to be unable to process the amount of fluoride found in municipal drinking water. Municipal water, for the most part, is pretty safe". In spite of the fact that water is filtered and treated, according to Durham it is "almost impossible to get water [100%] pure. That's not even a possibility".

So is drinking bottled water the solution in the quest to avoid water contamination due to fluoride additives? Kurdziel does not think so. "Bottled water has more additives than tap water. Bottled water sources still must be treated for the same things tap water is treated – color, odor, sediment, turbidity – and since it is lower in the ground than [municipally sourced water] more additives are needed to bring up the pH. Groundwater is very acidic". Not to mention the bisphenol-A (BPA) and phthalates that may be present in the plastic bottles holding that spring water that is advertised as being so pure. (According to the *Journal of Toxicology and Environmental Health*, phthalates have been classified as "possible

human carcinogens"; BPA is commonly known to disrupt the hormonal functions of the human body). This, however, is also another issue for another article.

The important thing to remember at this point is that alternate water sources may contain naturally occurring fluoride at levels far above what municipal waters contain. According to RI Department of Health Private Well Program Manager Robert Craft, "Unless you test the well you have no idea how much fluoride is in the water. One test site we did had levels at .2 mg/L; another had levels of 7.2 mg/L. There is a lot of variance over a small geographical area and no known reason as to why". Residents of Bartlett and Cameron know this information first hand. In the end, it appears that municipal drinking water – fluoridated and all – is the safest water source you will find. Drink up!

KJM
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*For reasons of personal confidentiality, this person did not wish to be identified by his true name. That confidentiality is respected here.