Water Fluoridation: the Science, Citizens Beliefs, and Politics

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Chicago: My Dental Roots

Chicago, June 2009
Portland: Cavities, A “Different Animal”
Volunteering: 23 Years Later
Public Health

• Goal is to improve the health of a population
• It values the “collective good”
• 3 Criteria to justify public health measure:
3 Criteria to justify public health measure:
1. reduction of ill health
2. reduction of health disparities
3. concern for children who constitute a vulnerable group
Good Oral Health: E.P.A.

- Education
- Prevention
- Access to Care
Oral Disease “Learnings”

• Cannot have good health without good oral health
• Healthy kids learn better
• Cannot drill our way out of this “mess”
• Prevention is key
“Filling teeth and treating oral disease are not necessarily the same thing.”
Cavities: An Infectious Disease

- Treating oral disease and filling teeth are not necessarily the same thing.
How Does Fluoride Work ??

• As the teeth grow and develop, fluoride is incorporated into the enamel.
• After the teeth erupt fluoride reverses the acid breakdown of the enamel surfaces.
• Surface enamel with fluoride is more resistant to future acid attacks.
What Causes Cavities??

- Sugar is the food for the bacteria
- Bacteria produce acid within seconds
- A microscopic war at the tooth surface
- It is at this enamel surface that fluoride comes to the rescue in the form of a fluoroapatite crystal
We drink through our mouths
Fluoridation is the *adjustment, either upward or downward* of the existing naturally occurring fluoride levels in drinking water to an optimal level that has been determined by our public health experts in the U.S.
The Father of Fluoridation

• 1901-1931: 30 years it took to figure out that it was the fluoride in the water.
• 1939: To figure out what the optimal level of fluoride in water.

Frederick McKay
Fluoridation has been a public health practice in the U.S. for 72 years. Grand Rapids, Michigan, fluoridated its public water supply on January 25, 1945.
Water Fluoridation: An Important Public Policy Issue

Fluoridation is recognized by the U.S. Centers for Disease Control as one of the 10 greatest public health achievements in the 20th Century.
Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations.

- Dr. C. Everett Koop
U. S. Surgeon General, 1981-1989
Naturally Fluoridated Communities
New Additive Delivery Vehicle

Pelletized/tablet

- Erosion of calcium binder to release Sodium fluorosilicate
- Less personnel handling exposure
- Simpler operating strategy
- Selected by NIH for BIO Innovation recognition
Fluoride Toxicity

You're not going to poison my water with fluoride!
Toxicity: Dose Related

“All Substances are poisons: there is none which is not a poison. The right dose differentiates a poison and a remedy.”

Paracelsus 1493-1541
Dental Fluorosis Definition

- Opponents: "Chronic Fluorine Poisoning"

- Proponents: "A cosmetic marker": fluoride is ingested at level >.05-.07/mg/kg/day in first 8 years of life.
Figure 3. Change in dental fluorosis prevalence among children aged 12–15 participating in two national surveys:

- Unaffected: NIDR, 1986–1987 = 47.1%, NHANES, 1999–2004 = 39.6%
- Moderate and severe: NIDR, 1986–1987 = 1.3%, NHANES, 1999–2004 = 3.6%

**NOTES:** Dental fluorosis is defined as having very mild, mild, moderate, or severe forms and is based on Dean's Fluorosis Index. Percentages do not sum to 100 due to rounding. Error bars represent 95% confidence intervals.

## Risk of Fluorosis in a Fluoridated Population

Implications for the Dentist and Hygienist

### TABLE 1

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>PERCENTAGE OF CASES THAT CAN BE ATTRIBUTED TO EXPOSURE TO EACH VARIABLE</th>
<th>95 PERCENT CONFIDENCE INTERVAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushed teeth more than once per day using more than a pea-sized amount of toothpaste throughout the first eight years of life</td>
<td>71</td>
<td>51-99</td>
</tr>
<tr>
<td>Inappropriately given fluoride supplements during the first eight years of life</td>
<td>25</td>
<td>18-34</td>
</tr>
</tbody>
</table>

*Toothpaste: 71%*
It is important to understand that fluorosis is not a disease, and that any child with these milder forms of fluorosis will also benefit from fluoride’s protection against tooth decay.”

Iowa Fluoride Study: 1993-ongoing. 10 NIH grants have supported this important research.
Which ones have fluorosis?
Which ones have fluorosis?
My Personal Fluorosis Statistics
3 Key Observations

• It’s much easier to scare the public than to un-scare the public.

• The support for fluoridation is a mile wide, but the passion is an inch deep while the opposition support is an inch wide,……

• Stopping a long-standing fluoridation program can be as difficult as starting a new fluoridation program.
Correlation is not Causation
Understanding Fluoridation Politics

• “A lie can travel halfway around the world while the truth is putting on its shoes”.
  Mark Twain
  1835-1910
Fluoridation Fib

What the Fluoride Action Network Cites

Effect of long-term exposure to fluoride in drinking water on risks of bone fractures.

Li Y, et al  Center for Dental Research, Loma Linda University School of Dentistry, California 92350. USA.

* p<0.05 as compared to the group of 1.00-1.06

Prevalence of Overall Fractures (%)

Fluoride in Water (ppm)

1.00-1.06 1.45-2.19 2.62-3.56 4.32-7.97

5.11 6.04 6.09 7.40 *
Fluoridation Fib

The Rest of the Story

Effect of long-term exposure to fluoride in drinking water on risks of bone fractures.

Li Y, et al. Center for Dental Research, Loma Linda University School of Dentistry, California 92350. USA.

*BEST

* p<0.05 as compared to the group of 1.00-1.06
Fluoridation Fibs

ADA: Mild Fluorosis

Mild Fluorosis: PW Light
Fluoridation = Prevention For All

“In a perfect world we would not need safety net dental clinics or fluoridation. We do not live in that world.”

Charile LaTourette, immediate past Executive Director, Dental Foundation of Oregon
Fluoridation Websites

• [www.ilikemyteeth.org](http://www.ilikemyteeth.org)
• [www.cdc.gov/fluoridation](http://www.cdc.gov/fluoridation)
• [www.ada.org/fluoride](http://www.ada.org/fluoride)
• [www.americanfluoridationsociety.org](http://www.americanfluoridationsociety.org)
• [www.fluorideexposed.org](http://www.fluorideexposed.org)

• Please “like” Campaign for Dental Health and the American Fluoridation Society on Facebook.

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