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LEGAL ISSUES OF FLUORIDATION

Prepared by: Dental Didactics, 1999

Learning Objectives

- Understand the legal issues related to fluoridation of public water supplies
- Understand the basis of constitutional court challenges to fluoridation
- Be acquainted with pathologic conditions associated with excessive fluoride exposure/consumption/overdose
- Review the possibly unnoticed sources of fluoride exposure in the environment and food chain
- Be prepared to enter private discussion or public debate with an understanding of the legalities of fluoridation

A Sensitive Issue

As we approach the beginning of a new millenium, there are many health issues in the forefront of public debate. Among these is the deliberate fluoridation of our public water supplies for the express purpose of preventing dental caries, primarily in children. This is an issue which dental professionals will be asked to comment upon, and in many instances present testimony about, both in their practices and in public forums or debates.

The majority of dental professionals are acquainted with scientific literature discussing the apparent benefits of fluoride as it relates to the prevention of dental caries. These benefits have been the object of many clinical research studies and most dental professionals support the judicious use of fluoride preparations to preserve the dental health of their patients. However, there is a body of evidence and legal argument with which dental professionals should be familiar prior to presenting themselves before patients or the public in a position of advocacy. This course presents some of these issues for review to better prepare dental professionals for entry into the public debate. It is not to be construed as a position paper or an endorsement of anti-fluoridation arguments. It is merely a review of the medical/legal arguments a dental professional might encounter in a debate regarding fluoridation of a public water supply.

Legal Basis for Fluoridation

In the United States, individual state, county and city governments often issue mandates to fluoridate the public water supply. Their right to this authority is based on the legal premise of performing a publicly beneficial police action; to retard the rate of dental caries in children. This is essentially a mandate that all citizens be medicated by means of the public water supply. The United States Supreme Court has never decided whether this is a valid exercise of the right of state police power or, as many contend, a violation of the constitutional rights of individual citizens to refuse medical treatment. The fact that fluoridation is usually proposed and advocated by dental and medical professionals, and numerous fluoride preparations are available only by prescription lends credence to this argument classifying fluoride supplements as a mass "medication."

States often exercise their right of police power, which is an implied constitutional authority to formulate and enforce laws to protect the health and safety of their citizenry. It is a common exercise of this authority, and one generally accepted without great debate, to mandate that public school children be vaccinated against contagious diseases. The states routinely demand that this group of citizens (students) receive MMR inoculations (mandatory medication) to prevent potential epidemics of measles, mumps and rubella. These procedures are seldom contested due to the general recognition that these diseases are communicable and highly contagious in a public setting and may in fact lead to a general epidemic.

The argument against public water fluoridation from a constitutional standpoint hinges on dental caries being neither communicable nor contagious. There is therefore no substantial threat to the general public health and safety. Those citizens most susceptible to this non-communicable disease can seek treatment individually by less invasive and more discreetly targeted means; there is no need to mass medicate the entire citizenry.

Another argument addresses the fact that the addition of fluoride to the public water system treats the entire populace, when it is only children (under 9-12 years of age) with developing dentition that are the apparent beneficiaries of treatment. Since this segment of the population is a distinct minority, the general public health (of the majority of citizens) is not served by this mandatory medication. Proponents of non-fluoridation submit that fluoridation poses a potential threat to some vulnerable segments of the population, especially the elderly prone to skeletal problems. The principle to “first, do no harm” so dearly embraced by health professionals is potentially circumvented by this form of mass medication. It is often argued that fluoride provides no health benefits whatsoever to the adult population; a claim which fluoridation proponents are hard pressed to counter with any accepted research. The federal government itself has conceded that the benefits of fluoride are restricted to the developing enamel of children age nine and under. A health law targeted at this segment of the population constitutes a minority interest; perhaps at the expense, and to the detriment, of the population at large.

Numerous lawsuits opposing the fluoridation of public water systems have been filed, yet none have been upheld, perhaps because the courts demand only the least demanding form of judicial review in these cases: the standard of “rational basis.” This merely requires the government to prove that worthy or legitimate goals were being sought by the practice of fluoridation and that the means employed were reasonably related to the successful meeting of those goals. There is an inherent presumption before the courts that any legislation (a statute mandating fluoridation) is actually constitutional unless proven otherwise. With that premise set, the courts employ the rational basis test.

Anti-fluoridation proponents seek the courts to employ the more demanding “strict scrutiny” standard of judicial review: determining if a law is depriving or infringing upon a fundamental constitutional right or freedom. The right so invoked would be that of refusing unwanted medical treatment; a right that a majority of citizens support in cases where an individual with a specific disease poses no threat to the general public (as in dental caries, which is neither communicable nor contagious.) The Supreme Court upheld this right in two distinct findings in 1990: *Cruzan v. Missouri Department of Health* and *Washington v. Harper*. Neither one of these two decisions has yet been utilized by lower courts in reviewing anti-fluoridation cases. The Supreme Court has found that the forcible injection of medications into a patient without their consent “represents a substantial interference with that person's liberty “ (in *Washington v. Harper*). Such decisions will undoubtedly be utilized to constitutionally challenge the laws regulating the fluoridation of water supplies.

Issues of Efficacy

Another issue in the debate is whether substantial evidence exists to substantiate the claims that fluoridation of water supplies is actually effective in reducing the caries rate. Anti-fluoridation proponents state that recent studies indicate that the caries rate is substantially declining without the addition of fluoride to the water supply. Reports from Europe, where most countries (including Germany, France, Holland and Sweden) prohibit the addition of fluoride to the water supply, have exhibited dramatic declines in the caries rate in the absence of water fluoridation.

This may be attributable to substantial fluoride exposure from in-office treatments, at-home rinses, dentifrices and the like: an argument that implies that fluoride is available at reasonable cost to the general public on an individual basis and need not be added to the water supply. Anti-fluoridation proponents argue that there are many alternative methods of delivery available for patients who desire to receive fluoride. Topical treatments in the form of gels, rinses and dentifrices are readily available and better able to target a specific population of children. For those who desire ingestible fluoride, drops and tablets are readily available. It is also readily arguable from an economic standpoint, that it is feasible to supply all children at risk with individual fluoride prescriptions. This strategy is less expensive than the fluoridation of a public water supply. It also overcomes the problem of intermittent and unequal usage of the water supply by children: essentially an issue of patient compliance. Parents are much better able to regulate a child's intake of a daily fluoride supplement than they are able to monitor their exact water intake.

Additionally, fluoride is not recognized as an essential human nutrient.

Issues of Safety

Numerous studies and reports indicate the dangers of fluoride ingestion in excess of established maximum amounts. Dental authorities currently recommend a level of 1ppm (part per million) fluoride in drinking water as ideal; this provides for the ingestion of 1mg/day, if an individual ingests 1 quart of water per day. Several basic issues of safety are related to this recommendation:

- **Total Fluoride Ingestion:** Recommended in the 1950's when it was estimated that total daily fluoride ingestion was 0.2 mg/day prior to fluoridation. Questions arise today regarding the ingestion of fluoride from sources other than drinking water. Studies indicate that the total fluoride ingestion today approaches 2.0 mg to 4.0 mg/day even in areas without water fluoridation. Since fluoride is utilized in both fertilizers and pesticides it bioaccumulates in the foods we ingest and many commercial beverages are manufactured with fluoridated water. Oral hygiene products (rinses and dentifrices) contain substantial amounts of fluoride and also add to the fluoride exposure of the body. Anti-fluoridation proponents argue that our population is already receiving substantially more than the "ideal" amount of fluoride recommended to strengthen developing tooth enamel.
- **Toxicity:** Fluoride is recognized as a toxin and is poisonous at higher levels of exposure. The levels of fluoride present in pesticides and fertilizers require a skull and crossbones and strict warning labels to be prominently displayed on their packaging. Anti-fluoridation opponents will often utilize this classification of fluorides as "poisons" to emotionally charge debates. As it is generally realized that most beneficial medications are also toxic at higher levels, the debate usually will focus on what level of fluoridation will balance risks and benefits.

- **Bioaccumulation:** Fluoride is known to accumulate in body tissues (obviously, this is how it is incorporated into tooth enamel). The fluoride burden of our individual bodies is always an issue in these debates, as well as the amount of fluoride that is accumulating in our foods due to public water fluoridation. Fluoridation proponents will often hold that drinking tap water is optional should an individual desire not to ingest fluoride from the water supply. However, foods and beverages in fluoridated communities are prepared using fluoridated water: making it almost impossible for citizens to avoid the intake of fluoride without exceptional measures. Fruits and vegetables usually also contain amounts of fluoride due to the use of fluoride-containing pesticides and fertilizers.
- **Lead Uptake:** An increase in lead uptake, due to fluoride interaction with certain solders in a community's plumbing, is an issue. Additionally, fluoride added to drinking water supplies may be “legally” contaminated with up to 400mcg of lead per liter. Fluoride is thus not the only heavy metal that would increase in exposure and bioaccumulation levels.
- **Actual Levels of Fluoride Ingestion:** Dental authorities recommend an optimal dosage of fluoride as 1mg/day to strengthen the developing enamel of children's teeth. The recommendation to place 1ppm of fluoride in the public water supply is based on two assumptions:
 - Firstly, that an individual will ingest 1 quart of water each day with this dosage. That is very difficult to predict and impossible to regulate. Climates and individual habits differ greatly and some individuals will drink far more, or far less, than this ideal amount. This is akin to a problem of patient compliance with which every dental professional is familiar. Some patients may ineffectively under-medicate themselves, while others may detrimentally over-medicate.
 - Secondly, that this is the only source of fluoride to which the individual is exposed. Again, baseline studies taking into consideration the fluoride available in food and beverage preparations are necessary to truly evaluate the need for additional fluoridation. Studies in some court cases have indicated an already established daily intake of 2-5mg/day of fluoride in some non-fluoridated communities. Studies have indicated that the ambient fluoride and estimated intake may be as much as 5.7 times the fluoride level of the water supply. With “optimal” 1ppm fluoridation, the “halo effect” of additional fluoride from foods and beverages can effectively deliver 6.6 mg/day.
- **Adverse Results of Fluoride:** Besides the obvious result of dental fluorosis (brittle, mottled, malformed enamel) with which the dental professional is well acquainted, other less obvious adverse affects are attributed to an over-abundance of fluoride:
 - **Dental Fluorosis:** Increasing in prevalence even in non-fluoridated communities, mandating increasing amounts of invasive cosmetic and restorative dentistry.
 - **Skeletal Fluorosis:** The excessive bioaccumulation of fluoride in the skeletal system due to over-exposure. With many of the signs and symptoms of chronic arthritis, this malady is often undiagnosed in its early stages. It results in brittle skeletal bone structure and an increase in the prevalence of hip fractures among the elderly; a segment

of the population at special risk from increased fluoride intake. Skeletal fluorosis is estimated to occur in 40 years with only a 2mg/day intake of fluoride. It increases more rapidly and with greater severity when the daily dosage is between 2-8 mg/day. Fluoride works by increasing the stability of the bone's crystal lattice: rendering it more brittle. In children, overexposure during growth and development of the long bones leads to distinct skeletal deformities. Dental professionals entering into public debate regarding fluoridation should be aware that the skeletal deformities in young children due to this condition are tragic and anti-fluoridation proponents will often present dramatic photographs of clinical cases during debate, emotionally charging the issue.

- **Hyperparathyroidism:** A secondary effect of excess fluoride intake.
- **Neurologic Dysfunction:** Fluoride is a potent enzyme inhibitor (part of its anti-caries activity being attributed to inhibition of the enolase enzyme) and some neurologic dysfunction is attributed to excess fluoride intake. 1995 studies demonstrate that fluoride does cross the blood/brain barrier and that the central nervous system is vulnerable to the effects of fluoride. Pathologic blood plasma levels in rats, which were achieved with the ingestion of 75-125ppm fluoridated water were achieved in humans after drinking solutions of only 5-10ppm fluoride.
- **Thin Margins of Safety:** The optimal fluoridation level recommended by dental authorities is 1ppm: the equivalent of 1mg/day fluoride ingestion. The Environmental Protection Agency (EPA) has set the Recommended Maximum Contaminant Level (RMCL) for fluoride in drinking water at 4 mg/Liter, assuming the ingestion of 1.4 – 2.0 liters of fluoridated tap water per day (dependent on annual average ambient temperatures). Should there be any significant additional water intake, or intake from other non-recognized sources (such as the “halo effect” from foods and beverages), the maximum daily limits could easily be exceeded. This constitutes another aspect of the argument that the actual ambient fluoride ingestion levels in our communities have not been adequately studied.
- **Groups at Risk:** As with any medication or ingested supplement, there are some groups in our communities that are risk for adverse reactions. Those at risk in the fluoridation debate include: the elderly, individuals with deficiencies of vitamin C, calcium or magnesium, cardiovascular patients and those with kidney disease.

Although great controversy exists over the actual clinical significance of differing levels of fluoride exposure, there is little doubt that the purity and protection of our national and local water quality is an issue of increasing concern and legislation.

Legal Challenges to Fluoridation

The United States Supreme Court has not yet ruled specifically upon whether the fluoridation of the public water system constitutes a violation of individual constitutional rights. It has also never ruled that states can legitimately compel individuals to ingest fluoride through the vehicle of tap water when means exist of better targeting the child population under 9 years old. However; numerous legal arguments have been presented before the courts regarding a full spectrum of individual's rights and liberties as they pertain to this issue. Dental professionals should be familiar with the following arguments, findings and legal opinions as they relate to the ongoing debate regarding fluoridation:

- **De Aryan v. Butler:** A case in 1953 brought against the City of San Diego and the State Board of Public Health. De Aryan contested that the state had exceeded its authority in delivering fluoridated water to an entire populace. The court found that the authority had not been exceeded and that the enforcement of police powers by the state is an indispensable part of the state's responsibility to its citizens. This authority cannot be limited unless it is used “unreasonably.”
- **Dowell v. City of Tulsa:** Plaintiffs argued that the police power of the state is limited to the control of “contagious, infectious or dangerous diseases.” The court failed to make a distinction between the differing natures of diseases and felt the differences were immaterial.
- **Kraus v. City of Cleveland:**
 - A Fourteenth Amendment challenge claiming that fluoridation constituted an infringement of fundamental personal liberties. The plaintiffs held that every person has the right to protect his/her own health as they deem best to insure long life and that fluoridation deprives the individual of this right. The court recognized that the individual has this right, but that it could not be seen as absolute; it is subject to the limits of police power. The plaintiff argued that this was true only in cases of general public danger or overriding public emergency, and that dental caries constituted neither threat. The court, however, ruled that dental caries was in fact a “serious and widespread disease, and any reasonable measure designed to decrease or retard the incidence of dental caries is in the interest and welfare of the public.” This is an example of the rational basis test. The court also emphasized that the Fourteenth Amendment addressed basic, fundamental liberties such as the freedoms to marry, bear children and live and work where a person chooses; not avoid fluoridated water.
 - Also a First Amendment challenge claiming that fluoridation “compels people to take a form of medication contrary to their religious beliefs.” The court found that “freedom of religion has a dual aspect: the freedom to believe and the freedom to act on your beliefs. The first is an absolute right, but the second is not and may be regulated to protect society. Individual freedom of religion must yield to regulations imposed in the interests of the public welfare.”
- **Teeter v. Municipal City of La Porte:** Another Fourteenth Amendment argument. Plaintiffs argued that fluoridation was “an enforced method of taking drugs and giving the same to children and that each individual should have the right to determine what to drink and eat without dictation from others.” The court decided that it was not appropriate to rule on the constitutional issues involved as it was not proven to the court that fluoride had toxic cumulative effects.
- **Chapman v. City of Shreveport:** A Fourteenth Amendment challenge claiming that fluoridation only benefited a limited class of citizens; children. The Supreme Court of Louisiana found that this exercise of police power was allowable because the law “was not arbitrary, oppressive or unreasonable.”
- **Paduano v. City of New York:** The court ruled that the state was justified in acting on the behalf of children who are too young to act for themselves in securing access to beneficial health care. It upheld the right of the state to intervene in an area of parental authority to serve a

public good, the reduction of dental caries.

- **Denial of Equal Protection Under the Law:** Several cases have been brought alleging that children with developing dentition are a limited class (a minority) of the citizenry, and that fluoridation does not serve the interests of the majority of the citizenry. The courts have held that fluoridation is not a limited class issue, because the children of today will be the adult citizens of tomorrow.
- **City of Brainerd, Minnesota v. State of Minnesota:** A Ninth Amendment argument alleging that fluoridation was a violation of the implied right of privacy. The argument here is based upon the individual's right "to be free from unwarranted governmental intrusion into matters so fundamentally affecting a person," (referring to termination of a pregnancy) as stated by the United States Supreme Court. The lower court did find that "the right of personal privacy could also extend to protect an individual's decision regarding what he will or will not ingest into his body. However, the constitution does not protect an individual against all intrusions, but only against intrusions which are not justified in the circumstances." The court stated that if the right to refuse fluoridation on these grounds was granted, it could conceivably be used to refuse chlorination as well and would put the public in jeopardy.
- **Safe Water Association v. City of Fond Du Lac:** A 1994 case arguing the Ninth Amendment implied right of privacy. The plaintiffs argued that cases such as Roe v. Wade greatly enlarged personal freedoms under the right to privacy. The court found that the rights to reproductive choice were not necessarily related to the right to be free from fluoridation.

Industrial Issues

Fluoridation debates may also include issues of industrial intrigue, with secret agendas and ulterior motives being attributed to various chemical industries. While no offers of proof are forthcoming, anti-fluoridation proponents will often assign blame for "fluoride dumping" on the pesticide, fertilizer and manufacturing industries. Much like the tobacco company bashing (which occurred prior to suppressed documents coming forward) anti-fluoridation proponents will argue that the chemical industries have historically been hard pressed to find a suitable outlet for the disposal of fluoride from manufacturing processes. These industries were previously forced to pay heavy fees or fines related to the disposal of this toxic, reactive heavy metal. With the advent of public fluoridation, these industries were presented with a profitable means of divesting themselves of an industrial poison: selling it to water districts as a beneficial additive.

Arguments may also be presented, that the vast bulk of pro-fluoridation research has been funded by chemical industry groups. This in an effort to preserve the validity of this method of disposal.

It is obvious that the discussion of the fluoridation of the public water supply is far from over. Dental professionals will be asked to participate fully in this debate and should be familiar with the various issues argued by anti-fluoridation proponents. With a better understanding of the issues and test cases involved the dental professional will be better able to engage knowledgeably in the ongoing debate.