

Mercury and the "Silver Filling": A Poisonous or Political Issue?

Silver fillings have been called "silver" for their color more than for their composition. Most commercial mixtures are named according to their major component, like wines. If a wine contains a 40%- 30%- 20%- 10% mixture of different grapes, it is likely labeled by the name of the grape that comprises 40% (or the majority) of the wine. With silver fillings containing approximately 50% mercury, 30% copper, 14% each of tin and silver, and 1 % zinc, what should the material be called? A "mercury" filling, of course. But we would not knowingly buy a mercury filling because we are aware that it is poisonous. We know it is poisonous, but just how is it poisonous and how much does it take to be poisonous? What does it do to us? That's what this chapter is all about. Science knows what mercury does in the human body. You have the right to know too.

Mercury is poisonous, but did you know that all five of the metals in the silver amalgam filling are poisonous? In addition to that, these metals react with each other and form sixteen more "corrosion products." All of these corrosion products are toxic.

But doesn't mercury stay within the filling? No. The chemical product formed by the "setting" of the five metals is chemically reactive. A mercury vapor meter placed over a filling can detect toxic amounts of mercury vapor within ten seconds. (Vapor- Mercury is a liquid. Liquids evaporate... TP)

Fillings release mercury just sitting undisturbed in the mouth, but there are several ways that we can cause our fillings to release increased amounts of mercury. The action of chewing foods increases the vapor escape for an hour or more after we stop eating. The action of chewing gum increases the vapor release due to abrasion as well as by compression of the filling for up to an hour and a half after we stop chewing it. Heat from coffee or other hot beverages increases the vapor release from the fillings.

The electrical charge generated between the various metals within a single filling, or between two different fillings, or between a filling and a crown or braces, releases mercury and corrosion products into the mouth.

How much mercury is released during a day? Is it significant? Articles published in the scientific literature show mercury releases from 20 to as high as 150 micrograms per day depending on the conditions of the study and the type of amalgam. The state-of-the-art high-copper amalgams release 50 times more mercury in a given time than the older "conventional" amalgams. According to Chang at the University of Arkansas, one microgram damages nerve tissue.

The bad thing about mercury release is that it is cumulative. In the fastest elimination mode, if one microgram is absorbed, it will take 70 days to several months to eliminate half of it. Meanwhile, the next day you absorb another microgram, and 69-and-a-half 70ths of the original one microgram are still there. On day three you absorb another microgram, and you still have 69 70ths from the first day, and 69-and-a-half 70ths from the second day, so you can see that even with the fastest elimination, excretion is negligible compared to intake if you have amalgam in your mouth. You will still increase your total body burden of mercury daily.

Not all of the mercury escaping from a filling stays in the vapor form, especially if it is on the surface of a filling registering a negative electrical charge. In the electrical environment on the surface of a filling, mercury vapor is rapidly converted into the highly toxic methylmercury.

Just how many forms of mercury are there in the body, and what do they do? Actually three forms are of primary significance.

The first is mercury vapor. Mercury vapor escapes from the filling, is absorbed through the lungs and intestinal tract, and enters the bloodstream. The primary target for mercury vapor is the brain and central nervous system.

Second is mercury in the ionic form that has two positive charges. Ionic mercury is the *most destructive* form

(termed acute and of high magnitude), but its destruction is limited to the area around which it is located. It does not have the ability to move around or through tissues like other forms of mercury. Its damage is usually found in organs like the kidney and the gastrointestinal tract.

The third form is called **methylmercury**. This is the organic form. On contact with bacteria in the mouth, stomach and intestinal tract, or in the bloodstream, a process called methylation converts both mercury vapor and ionic mercury into deadly methylmercury. The severe toxicity of methylmercury is attributed to its ability to pierce any cell membrane in the body, and cross all barriers, even the placenta and blood-brain barrier. After crossing these barriers, methylmercury is converted back into the highly destructive ionic form, and destroys all cell components in its path. The transportation mechanism into cells is its primary damaging component. Its conversion to ionic form then deposits the "killer" form of mercury in areas it could never penetrate in the ionic form. By this mechanism, methylmercury is credited with creating degeneration and atrophy of the sensory cerebral cortex, paresthesia (numbness and tingling), as well as hearing and visual impairment. In crossing the placenta, it can inhibit brain development of the fetus and create cerebral palsy or psychomotor retardation in the latter stages of development.

Once mercury reaches its destination tissue, it has many ways in which it may express its toxicity. They include the following:

1. Alteration of Cell Membrane Permeability

Each cell is guaranteed its sovereignty by the presence of a cell membrane that selectively lets some chemicals in and keeps others out. When mercury causes interference in the selective mechanism, the cell may absorb the wrong raw materials, and dispense unfinished enzymes or proteins. Cell membranes are rich in sulfhydryl groups, which explains the preference of mercury to bind to membranes. This binding causes cross-linking of proteins within the membrane, which leads to the "leaky membrane" phenomenon.

2. Alteration of Tertiary Structure (Third-Dimensional Form)

Molecules are composed of three-dimensional cloud vapors that react with other molecules because of a mutual fit of their external surfaces. When mercury enters a molecule, it can alter the 3-D form of the molecule such that the key/lock mechanisms no longer fit. This stops the normal chemical reaction that should take place.

3. Alteration of Enzyme Function

Most chemical reactions that the body depends on for daily survival would take hours or weeks to take place in a test tube. Enzymes are proteins that intercede in these necessary reactions by pulling two chemicals closer together such that they react in microseconds instead of days. Mercury can attach to the critical binding areas of enzymes and push the reaction time back to days instead of microseconds.

4. Interference in Nerve Impulses

Nerve impulses travel along nerves. During the trip from the brain to its destination, a nerve impulse does not travel on one continuous nerve. The nerve itself is composed of short segments that intersect at an area called the synapse. Impulses jump the synapse, for there is a space there, between the two nerve segments. The impulse will not jump if mercury is in the gap area. This can result in the end action not happening at all, or happening sporadically due to some impulses getting through, and others not. The resultant sporadic impulses can create tremors and shakes in muscles and altered doses of endocrine hormones to be secreted.

5. Alteration of the Genetic Code

By cleaving our genetic code, called DNA, mercury can cause anything from birth defects in the fetus to altered enzyme formation within brain cells. DNA is a series of purines and pyrimidines linked into a long thread. Two interdependent threads intertwined is the actual form of DNA. Mercury can break one of these threads, leaving the threads attached, but nonfunctional. This is called a single-strand break. It can connect two DNAs together, creating DNA-DNA cross-links, which are the hallmarks of cancer.

6. Inhibition of DNA Repair

Normally when DNA is injured, resulting in a single-strand break, a reductase enzyme repairs the injury immediately. The reductase enzyme is inhibited by the presence of mercury and repair does not take place.

7. Interference with Endocrine Function

Glands that produce hormones are called endocrine glands. Examples of hormones are thyroid, estrogen, testosterone, pituitary, adrenalin, and insulin. Tiny amounts of hormones create major changes in our internal biochemistry, so minute alterations of dosages can severely damage our system. One atom of mercury per molecule can inactivate an entire molecule. Multiple

atoms could then be related to "female problems," sterility, lack of energy, and blood sugar fluctuations.

8. Contribution to Autoimmune Disease

Autoimmune disease is a condition in which one's own immune system destroys the cells of his own body. Why does the immune system do this? It is killing your own soldiers. This is a case of mistaken identity. The immune system ignores cells that have your personal genetic code on them. These are called "self" cells. When mercury attaches to a cell, it slightly distorts the shape of the cell (like exchanging a nose for an eye), and the immune system does not recognize it as self. It is called "nonself." Any nonself cell is slated for immediate destruction. Examples of autoimmune diseases are diabetes, arthritis, multiple sclerosis, systemic lupus erythematosus, scleroderma, amyotrophic lateral sclerosis, and AIDS.

9. Digestion and Absorption Alteration

Mercury can kill or alter the digestive bacteria in the intestinal tract, resulting in the formation of abnormal nutrient products. In other actions, it can bind with the intestinal wall absorption pores and electrically reduce absorption of even properly manufactured nutrients.

10. Contribution to the Development of Antibiotic Resistance

Some bacteria alter their form when exposed to mercury. They can do this by adding new genetic material to their DNA. This additive is called a "plasmid." The purpose of developing the plasmid is to allow the bacteria to become resistant to mercury. A side effect of the addition of the plasmid is that many of the bacteria simultaneously become resistant to certain antibiotics. This contributes to the antibiotic resistance problem that generated the need for constant development of new antibiotics. Biochemically, the drug companies are about at the end of the number of combinations of chemicals that can produce new antibiotics.

How much mercury does it take to create destruction?

Actually, very little. Let's look at some of the past ten items. How much mercury does it take to disrupt the cell membrane? One part per million (ppm) will alter cell membrane function. Stopping cell growth or reproduction (not addressed) can occur at levels as low as 0.2 ppm. One ppm ionic mercury will substantially reduce the activity of succinic dehydrogenase, ATPase, and alkaline phosphatase in the brain. Glioma cells of the brain are destroyed at 0.2 ppm ionic mercury, and only 0.04 ppm of methylmercury. Even the most resistant parts of the central nervous system are destroyed at 2.5 ppm. Ten ppm ionic mercury will induce cancer-producing DNA-DNA cross-links. This amount can also cause genetic defects. Only 2 ppm of the inorganic form will inhibit the rejoining of single-strand breaks in DNA mentioned earlier. The blood-brain barrier loses its protective selectivity at 1 ppm within hours of administration of either the ionic form or methylmercury.

How many people are actually reactive, sensitive, or allergic to mercury? That depends on who you ask and which question you address.

Sometimes the ADA uses the term "allergic" to describe mercury reactions. That is like being allergic to arsenic or lead. As you can see from the preceding materials, mercury kills cells. Toxicity is not really an allergic reaction, but a pathological disease-producing reaction.

Immunologic Aspects

There are two standard ways of measuring immune activity. We can measure the "viability" of the lymphocytes to get an idea of what concentrations of mercury kill or inactivate our immune system. If lymphocytes are killed, it is a simple matter to stain and count the percentage of dead cells at a given concentration of mercury. Another way to measure immune activity is to measure "immune complexing" in our blood serum. Immune complexing is what happens when our body's immune fighters, called immunoglobulins, or antibodies, come in contact with an invader, called an antigen. In this case mercury is the invader. If blood serum antigen-antibody complexing occurs, the serum is clouded, and the difference in cloudiness can be measured, giving us an idea of the intensity of the reaction.

Using both of these systems, it has been demonstrated that minute amounts of mercury inactivate over 90% of our immune protection system. Our normal immune system has some soldiers to spare, but not that many.

How does the ADA react to this information that over 90% of the population sustains immune reactions to mercury? In June of 1984, the ADA published in *Science Digest* that only 5% of the U.S. population was mercury

sensitive (twelve million people) and that was considered insignificant. By the next month, July of 1984, the ADA dropped their figures to 1 %, and again claimed that it was insignificant. They compromised at 3% in yet another article, and subsequently said they had only fifty documented cases this century mentioned in dental literature. Of course they excluded all other publications, scientific or trade.

About this same time, the ADA was changing its attitude on what might be called toxic levels of mercury in the urine of their member dentists. In 1983 the Centers for Disease Control (CDC) in Atlanta, Georgia, listed 30 micrograms of mercury per liter of urine as the maximum acceptable level. The word "acceptable" is used because it can't really be called safe. One atom of mercury kills. Zero mercury will never be achieved on this planet, so what is practical? The CDC feels that thirty micrograms is reasonable.

Dr. P. L. Fan of the ADA and Dr. Wilmer Eames, a former dental school professor specializing in amalgam placement procedures, got into what appeared to be a bidding war. Publishing in the ADA newsletter and ADA trade journal, they countered with saying 125 micrograms was safe for dentists, then pushed it up to 150. Next it went to 250, and finally, by the end of 1984, the safe level for mercury in urine was up to 500 micrograms per liter. I (HH) personally asked a CDC official his opinion of this situation. He would not allow his name to be used, but nonetheless offered me a quotation: "It looks to me like an accommodation for sloppy procedures."

Is mercury the only problem?

While taking a master's degree at the University of Colorado in the late '80s, we began investigating blood reactivity to dental materials. It was obvious that mercury created havoc in the immune system, but what about the other components in dental amalgam? My master's thesis was on that topic. All the metals in amalgam were toxic, but not to the same degree. Over the next year, we developed a test for most of the common dental materials including composites, impression materials, crown and orthodontic materials, etc. Varying degrees of toxicity were evident in all dental materials. What's absolutely safe? Only the original tooth. Even examining the materials that were immune compatible most of the time, we would still find that 10% or 20% of people were still highly reactive. There was no pattern. We decided that the "least reactive" materials were best determined on an individual basis and to select them over the moderate or most reactive materials. After all, our immune system is under constant challenge just being on this planet. The air, food, and water are our purest exposures, and even they contain things that cause minor reactions in our immune system.

All dental materials supply some immune challenge, but if we select materials from the least reactive range, we can probably avoid a pathologic response. Now the most reactive materials present a different problem. Many of these, like mercury, copper, zinc, beryllium, nickel, chromium, cobalt, phenol, and others, will forcefully challenge the immune system. When the cumulative challenges from life exposures, together with round-the-clock exposure from dental materials, exceeds your immune defense, disease can result.

Focusing on our 1988 mercury results in the testing of 1,000 people, we found immune reactivity in 89% of those patients. In 1990, the figure on an additional 2,500 people tested from all over the world was 90.2%. Then by 1994 it moved up again, to 92%, and by 1996 it had increased to 94% in testing over 3,000 more people. Why do you suppose there was an upward trend on the same testing? I have a feeling that it is because of the increased use of high-copper amalgam. It releases 50 times more mercury, and has a negative electrical charge on the surface of the filling, which is conducive to the formation of methylmercury. The increase in mercury release plus the addition of methylmercury could explain the overall increase in immune reactivity. At any rate, it is certainly not the 1%, 3%, or 5% suggested by the ADA. You need to be informed of your chances. Mercury's immune reactivity is not to the 100% mark yet. Toxicity, as in killing cells, yes, it is 100%, but in dental materials testing, we are examining only immune reactivity.

What about the safety issues of mercury exposure? Aren't we supposed to be protected by the ADA, the FDA, CIA, someone with three initials? Isn't there a watchdog looking out for us?

Dental associations worldwide generally mimic the American Dental Association policies. To protect the dental industry, both dentists and manufacturers, the associations are forced to defend mercury as totally safe despite their own 1 % and 5% figures. As an example, in the March 1971 ADA journal, the editor was asked, "Are amalgam fillings hazardous to the patient?" He replied, "The answer is an unqualified *no*. Study after study

shows the patient undergoes no risk ... the dentist, yes, but the hazard can be reduced to practically zero."

"Study after study"? Despite numerous requests, the ADA has never been able to produce the "study after study" that proves the patient undergoes no risk.

Why? Because there are no such studies.

The British Broadcasting Corporation (BBC) program "Panorama" aired a program in July of 1994 in which interviewer Tom Mangold interviewed Peter Gordon, the scientific adviser of the British Dental Association. From the transcript, Gordon of Britain reflected the ADA views.

Mangold: "Is amalgam safe?"

Gordon: "In a word, `yes!'"

Mangold: "No doubt about that at all?" Gordon: "No doubt about it at all."

The same "Panorama" program interviewed Lars Friberg, M.D., Ph.D., and former head of toxicology for the World Health Organization. As a scientist and specialist in the toxicology of mercury, he had a somewhat different view.

Mangold: "Dr. Friberg, is there a safe level of mercury?"

Friberg: "No, there is no safe level of mercury and no one has actually shown that there is a safe level and I would say mercury is a very toxic substance."

Mangold: "If there is no safe level of mercury, why does the British Dental Association say there is one?"

Friberg: "I don't know, but I think they're wrong."

If these dental associations think mercury is safe, then why do they insist that dentists use the "No Touch" technique when placing amalgam? Here are their recommendations-and, incidentally, why are they for dentists only?

- Mix amalgam in a closed container.
- Use the "No Touch" technique, whereby placement of amalgam is done with mechanical instruments.
- Work in well-ventilated areas.
- Alert all personnel to the potential hazards of mercury vapor and the necessity of practicing good mercury hygiene practices.
- The dentist must wash his hands immediately after placement into the patient's mouth.
- Store scrap amalgam (left over from placement in your mouth) in a tightly sealed container-preferably under glycerin-and have toxic waste specialists dispose of it.

In response to growing public concern, the ADA produced a pamphlet in 1991 that addressed the critical questions about mercury. Here are some excerpts, with my comments in parentheses.

Statement: Mercury is used in dental amalgams.

Answer: TRUE. When mercury is combined with these metals it becomes an inactive substance. (The sciences of chemistry and physics fail to confirm this statement.)

Statement: Dental amalgams are safe.

Answer: TRUE. Studies have been conducted worldwide for more than 100 years. (Their studies have yet to be disclosed.)

Statement: Amalgam is the most preferred dental restoration.

Answer: TRUE. Other materials have their drawbacks. (According to statements of multiple dental manufacturers in a current California lawsuit over amalgam, the sales of dental mercury in the past ten years have dropped from 220 tons yearly to 34 tons. Many of the manufacturers are offering great discounts to

dentists who will buy mercury, but few dentists are taking advantage of this deep discount. The main amalgam market is now third-world countries.)

Statement: Mercury is a naturally occurring element in the environment.

Answer: Mercury is found in food, water, and air. (Uranium, lead, and arsenic are also naturally occurring elements. This is not to be confused with the word "natural" as used in the health food industry. There is an organic form of mercury, too. Want some?)

Statement: Allergic reactions to mercury are very rare.

Answer: TRUE. Fewer than 100 cases have ever been reported. (In the dental trade journals-smart-thousands of reports have been sent to the FDA, but have never been acknowledged by them nor the ADA trade journal.)

To use a favorite quotation from the ADA, but in another context, "There is no scientific evidence that" proves any of their claims.

Scientific evidence of the toxicity of mercury is generously supplied in any of the scientific fields related to biology. This includes immunology, pharmacology, toxicology, endocrinology, genetics, and birth defects, etc. It does not include dentistry.

In another defensive ADA paper, "What '60 Minutes' Didn't Tell You," the ADA claims the "ADA over the years has been supportive of the considerable research that has been done on dental amalgam fillings and welcomes further scientific inquiry."

Experience has shown that the welcome mat to scientific inquiry points out instead of indoors. Many of those dentists who have inquired into mercury toxicity have lost their licenses or been put on probation for challenging the safety of mercury. If a dentist promises to return to placing amalgam and being quiet about the mercury issue, he can just live in fear, but with his license.

I use "he," but there have been several females who have bucked up against the boards in the interest of freedom to help their patients choose; they have been given no better treatment than their male counterparts. I would say worse, in fact, based on the demeaning attitudes of the board members toward women in these cases. One was told that if she thought mercury was dangerous, she must have a psychiatric evaluation before they would even talk to her.

In the state of Colorado, Judge Nancy Connick ruled in 1996 that patients were not allowed to ask a dentist to remove their fillings for toxic reasons. Can you imagine being a Ph.D. in toxicology, asking a dentist to remove your mercury because you know of the toxicity of mercury and choose not to have it in your body, and being eligible for fine and imprisonment?

The rubber meets the road in court. In the "Tolhurst" case in California, the ADA and several dental manufacturers were challenged on the mercury issue. The defense that got the ADA off was "We owe no duty of care to warn of the alleged danger of dental products which the ADA undertakes to research. If such a duty were imposed, it could result in limitless exposure to the ADA for every dental-related injury or illness."

How do you feel about the ADA Seal of Approval on toothpaste now?

Okay, so the dental industry is scared to death about legal responsibility for continuing to say that mercury is safe, when all the scientific evidence says otherwise ... it is only logical that they should do everything they can to protect the financial interests of the dentists, the manufacturers, and the insurance industry. I have no problem with that. If everyone who had come down with MS, lupus, arthritis, epilepsy, leukemia, ALS, diabetes, etc., could relate their disease to dental procedures, the ensuing legal battle would be for more money than there is in the universe.

But isn't there someone who is not financially involved? What about the FDA? Aren't they our protectors?

The 1976 U.S. Congress requested that the FDA "classify" dental products including dental silver mercury amalgam fillings. The *Federal Register* recorded another such request in 1980. Multiple requests have been made over the years, yet there is still no classification of dental amalgam.

What is the purpose of FDA classification? Here are some "sound bites" or abstracts from FDA law that may shed some light on the subject of safety. The purpose of FDA classification is "to provide for the safety and

effectiveness of medical devices intended for human use (mercury is included here) ... this law authorizes the Secretary to ban a device which presents a substantial deception or substantial unreasonable risk of illness or injury ... the Secretary is authorized to restrict the sale or distribution of a device if there cannot otherwise be reasonable assurance of its safety and effectiveness, especially if it is dangerous to health when used as indicated . . . (example) grossly hazardous products such as lead nipple shields which expose nursing infants to possible lead poisoning ... this procedure is designed to assure that all patients will be informed of newly identified risks associated with the use of a device to which they have been exposed."

In examining the word "risk," the risk need only be a potential one. The risk may be one demonstrated by reported injuries or it may simply be foreseeable.

Just what is this elusive and controversial classification?

Class I materials are those of low health risk. They require no special records or proof of safety. Examples are bedpans and tongue depressors.

Class II materials are those for which reasonable assurance of safety and effectiveness can be achieved through the application of special controls. These controls include performance standards, patient registries, dissemination of guidelines, etc. Examples are orthodontic headgear, and composite plastic dental fillings.

Class III devices are those instruments that are not totally safe, or sufficient studies have not yet been done to allow the FDA to determine potential harm or safety. Class III devices may aid life support more than impede it, as in the heart pacemaker; may be due to public demand, as in the breast implant; or assist people in birth control, as in the intrauterine devices.

The FDA has steadily refused to classify amalgam. They have classified mercury. It is in Class I, of no health risk.

One reason they offer for the Class I registration of mercury is that the health risks are inherent within the device, and that reclassification into Class III where it belongs would not alter the health risks.

This may be a key part of the situation we find ourselves in. Even the governmental agencies have been defending the use of mercury. Perhaps they are protecting each other. Consider for a moment the national consequences if mercury in fillings were reported to be dangerous. The offending parties (dentists, the ADA, and dental manufacturers and distributors in our case), if found guilty, would be submitted to one or more of the following FDA actions:

1. Repair the device so that it does not present the risk. (Mercury can't be removed. If it could, there would just be powdered metals left, which would be like filling a tooth with sand.)
2. Replace the device with one in conformity. (This could be done by replacing amalgam with composite or gold.)
3. Refund the purchase price of the device. (The ADA says dentistry places 93 million fillings per year. If fillings last ten years, and cost \$100 each on the average ...)

Neale Donald Walsch, in his book *Conversations with God, Book I*, [quotes God as describing how dogmas succeed](#). Dogmas are organizations such as religions, fraternities, or organizations that guide people's thinking-like the ADA. First, people need to believe they need what is offered. Next, they must lose faith in themselves to be able to do what the organization offers. The organization must have answers that the individual does not. Lastly, the individual must accept the organization's answers without question.

But should you become "enlightened" or exposed to the truth, they must expel and disgrace you with great fanfare, in order to intimidate the membership to continue repeating the herd instinct mantras that are required to maintain status quo. The ADA has certainly achieved these criteria to the letter.

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Note: The next Chapter entitled “A Nickel's Worth of Advice” advises you strongly against the use of nickel in the body, since it is also remarkably dangerous. What the dental profession calls “Stainless Steel”, actually has no steel in it at all: it is a special alloy of 70% nickel together with beryllium, cobalt, and chromium. The “Gold” in crowns, also is alloyed with toxic metals....

I received my first amalgam filling in 1961 at the age of 17. For most of my life the “white” fillings that are most common now were unfortunately, not yet in use. These fillings are better since they do not contain Mercury, but they still contain various toxic powdered metals... Different people react to each kind of white filling differently. A Naturopath can measure your reactivity to these to find which is best for you.

But as for me, well, layer after layer of Mercury was my only choice through the years. When fillings would wear or wash out, new “silver” would replace the old. And do you know what? One of the then unknown side-effects of Mercury in the mouth was to greatly accelerate dental decay..... Tom Plumb