

**CITIZENS' PETITION PURSUANT TO 21 CFR 10.30 TO THE SECRETARY OF HEALTH AND HUMAN SERVICES AND THE FOOD AND DRUG ADMINISTRATION REQUESTING BAN OF DENTAL MERCURY 21 CFR 895 OR IN THE ALTERNATIVE TO REQUIRE PROOF OF ITS SAFETY 21 CFR 80**

Via Registered Mail, Return Receipt Requested  
this 23rd day of October, 1993

TO: Secretary Donna E. Shalala  
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**I. ACTION REQUESTED**

This petition pertains to dental mercury classified pursuant to 21 C.F.R. 3700. It is requested that the Commissioner of the Food and Drug Administration:

A. Ban further use of dental mercury pursuant to section 516 of the Medical Device Amendments of 1976 (21 U.S.C. 360f) and 21 C.F.R. 895 (a) as the risk of illness or injury associated with the use of dental mercury presents an unreasonable, direct and substantial danger to the health of individuals; and (b) The potential or actual injury involved is a serious one that will endanger the health of individuals who have been or will be exposed to dental mercury and as it involves a serious long-term risk. (or in the alternative)

B. Reclassify dental mercury as a Class 3 device pursuant to section 513(3) of the Act (21 U.S.C. 360 c(e)) and 21 CFR 860 (and/or in addition or the alternative),

C. To restrict the use of dental mercury (a) to non-chewing surfaces in non-pregnant adults without kidney disease, thereby specifically excluding its use in children under the age of 18, individuals with any kidney compromise, and in pregnant women or women of child bearing age who may become pregnant (b) to oral environments where no other metals are present due to the already proven electrochemical effects of ion transfer pursuant to section 520 (e) of the Act (21 U.S.C. 360 j(e)) (or in the alternative).

D. To require a warning in regard to the toxicity of dental

mercury and the hypersensitivity (allergic reaction) that it may also cause. Pursuant to section 518 (a) of the Act (21 U.S.C. 360 h(a)(2)).

E. Under any of the alternatives B through D, to require that an environmental assessment be required by manufacturers pursuant to 21 CFR 25.22

F. To take immediate action or in the alternative to establish a special panel to consider this petition. The Dental Product Panel has shown by their past action and inaction to be incapable of properly dealing with this issue. The new panel should be composed principally of experts with knowledge of toxicology, not dentistry. Since this is a most serious matter if the Secretary and Commissioner decline to take immediate action then they should not allow the normal time of 180 days for action on this petition. In that event, it is requested that the panel be appointed within 15 days and that the panel be directed to take action within 60 days. The most important information set out hereinafter and referenced in footnotes number 1(a), 2, 3 and 4 was presented to the Commissioner in a letter of June 2, 1992 and much of the other information was previously presented to the FDA or contained in the Public Health Service Report of January, 1993, in which the FDA participated. Therefore a shortened time table is appropriate. All the information with the exception of a few unpublished papers is in the public domain and thus readily available to the FDA.

G. To forego the requirements of 21 CFR 10.29(a) requiring four (4) copies of references not exempted under Sec. 10.20(c)(1). The preparation of this petition has been very time consuming to provide four copies of all non-exempt references cited would be unduly burdensome on the petitioners. Much of the information contained in this petition has previously been presented to the FDA at the Dental Products Panel meeting, March 15th, 1991. Single copies of items which may not be readily available to the FDA are attached. There are references which are in a foreign language. Translation of these have been requested and will be furnished pursuant to 21 CFR 10.20(c)(2). The foreign language references should be ignored if necessary rather than delaying the consideration of this petition. There are sufficient references in English to support the requests of Petitioners. To the extent the FDA cannot obtain copies of additional references, those references will be provided. The burden of proof of safety, however, has been placed on the manufacturers and the FDA by Congress, and that should include the major burden for obtaining copies of these references and not on the petitioners.

(As the petitioners have no supplemental data sheet nor classification questionnaire, none is attached to this petition. If the FDA believe these are necessary and will be so kind as to send the appropriate forms, petitioners will attempt to complete

them at a later date. If there are any technical defects in this petition the Secretary and the Commissioner are requested to notify petitioners and their counsel as soon as possible by telephone.)

## **II. STATEMENT OF BASIS FOR DISAGREEMENT WITH PRESENT CLASSIFICATION**

Petitioners believe that there is no way to provide reasonable assurances of the safety and effectiveness of dental mercury. Obviously, dental mercury has no effectiveness by itself but the purpose of this petition is to address the safety issue. Hereinafter there will be frequent reference to mercury/silver fillings which of course is the ultimate product which dental mercury is used to make. The FDA maintains that mercury/silver fillings are a reaction product over which it has no jurisdiction, despite the fact that it has classified a number of other reaction products. While a Congressional act would clearly seem to require the classification of mercury/silver fillings, this petition is not addressed to that issue. It is, as previously stated, solely confined to the issue of safety of dental mercury. While this petition does not directly address the issue of amalgam alloy, it should be pointed out that the safety of the other heavy metals, which make up amalgam alloy, has not been properly dealt with by the FDA and will be mentioned briefly hereinafter. As set out in the reasons below, the evidence is clear that in those patients with mercury/silver fillings, dental mercury is the predominant source of mercury in the brain and other body tissues. There is absolutely no reason to believe that increasing the body load of mercury is safe, and there is every reason to believe that it is unsafe.

## **III. SUMMARY OF NEW INFORMATION**

A petition was filed by Victor Penzer, M.D., D.M.D., et al (Docket No. 85P-0370/CP) in 1985 requesting an investigation into the toxicity of mercury as used in dentistry. Subsequently, others wrote to the Secretary or the FDA providing additional references.

At the time dental mercury was classified in 1987 no mention was made to any of those references previously furnished. Since that time autopsy studies have shown that the brain-levels of mercury correspond to the filling surfaces and that the mercury is inorganic i.e. coming from the fillings, rather than methyl mercury coming from fish. This was substantiated by the World Health Organization's report in 1991 and three studies in 1992. In addition, studies since 1987 have shown that mercury from fillings compromises kidney function and causes increased resistance to antibiotics. Very serious questions have been raised as to whether or not mercury plays a role in the cause of Alzheimer's Disease. The adverse reaction reports received by the FDA and studies done by others very clearly show that mercury from fillings is capable of causing classic mercury poisoning with symptoms such as depression, psychological disturbances, headaches, etc. As is

typical with all chronic mercury poisoning, the determination that mercury is the cause of the problem is often most difficult and delayed. Perhaps the strongest new information was elicited by the FDA on March 15, 1991 in testimony by a number of experts and lay persons before the Dental Products Panel meeting. All of this new information and older information heretofore ignored or dismissed by the FDA is discussed in more detail in the Statement of Reasons hereinafter.

#### IV. STATEMENT OF REASONS AND SUPPORTING DATA

##### SCIENTIFIC STUDIES AND CLINICAL EVIDENCE CALL INTO SERIOUS QUESTION THE SAFETY OF MERCURY/SILVER FILLINGS

Mercury/silver fillings, commonly called amalgams, have been in use for approximately a century and a half in this country. There has always been a debate about the safety of using a substance as toxic as mercury for this purpose.

The Dental Products Panel of the FDA convened March 15, 1991 to consider the issue of safety versus toxicity from mercury/silver fillings and included Alfred Zamm, M.D. who stated, "The belief that a small amount of mercury is not clinically significant is the result of a major error in analysis."<sup>1</sup> The panel in discussing the issue seemed to conclude that mercury was safe unless proven otherwise, and that there was not sufficient proof of its harm to consider taking any action to insure safety to the public. But in so doing, they totally ignored the testimony of many, including the testimony of one of the world's foremost authorities on mercury, Lars Friberg, M.D., Ph.D. of the Karolinska Institute, Stockholm, Sweden, :

"In conclusion, we consider that dental amalgam, from the strictly toxicological point of view, is an unsuitable dental filling material. It is our opinion that, in the future, steps should be taken to use, as far as possible other material than amalgam. \*\*\* In the interim we find it highly appropriate to classify the mercury used in dentistry as a class III device."FDA Transcript 3/15/91, p. 81.

Dr. Friberg's testimony was followed by Dr. Zamm who concluded his remarks as follows:

In summary, dental mercury is a dangerous substance. It was a 170-year old anachronistic mixture of crude coin fil[l]ings and mercury that has been grandfathered in without scientific proof of safety. It is a dangerous substance that is 170 years old and should be banned. FDA Transcript, 3/15/91, p.138.

A review of the transcript reveals that the FDA Panel seemed more concerned about dispelling public fear of mercury/silver fillings than they were in insuring public safety.

A survey of all the available information has found nothing which will survive scientific rigor supporting the safety claims for dental mercury and/or mercury/silver fillings. The information relied upon by the FDA and others is a claim of 150 years of use without incident and various articles which either cite no primary research or are basically flawed. This is, in essence, anecdotal evidence of the worst kind.<sup>2</sup>

#### **A. SCIENTIFIC EVIDENCE**

In contrast, there is a great body of valid scientific literature impugning the safety of mercury/silver fillings<sup>3</sup>. This is accentuated by the findings of the World Health Organization (WHO) in 1991 regarding the contribution of mercury/silver fillings showing that a vast majority of the average body burden of mercury came from those fillings.<sup>4</sup> Dr. Friberg, in his testimony to the FDA, presented a number of studies to support WHO's findings.<sup>5</sup> The ADA has attacked this position repeatedly despite the fact that earlier autopsy studies (Eggleston; Nylander), both in this country and Europe, supported WHO's conclusions.<sup>3</sup> Four recent studies make WHO's conclusions unassailable.<sup>6</sup> The one by Aposhian, et al, appeared in the April, 1992 edition of the FASEB Journal. Despite the fact that the study consisted primarily of people in the 18-29 age group, thus having little time to accumulate a significant body burden, Aposhian found, "It appears that two-thirds of the Hg in the urine of students with amalgams originated from mercury vapor that initially had been released from the amalgams in their mouths." (page 2474).

A recent report documents high concentrations of mercury in the feces of an eleven year old child upon installation and subsequent removal of a single mercury/silver filling.<sup>12</sup>

Researchers (Grant, 1969<sup>7</sup>; Landrigan, 1982<sup>8</sup>) have suggested that the full extent of how Hg interacts with humans and the environment is only partially understood, but it is known that Hg is a cumulative poison with insidious symptoms which can be subacute, acute or chronic. One average-sized amalgam filling contains enough mercury to exceed the USEPA adult intake standard for non-dietary mercury for more than 100 years.<sup>9</sup> Dental amalgam has been scientifically proven to be unstable for over 100 years, because it becomes a battery when placed in electrolytes such as saliva.<sup>10</sup> Documented scientific research has proven that patients with dental amalgam fillings are constantly exposed to mercury throughout the lifetime of the fillings and that amalgam-derived mercury builds up in the patients' bodies with time.<sup>11</sup> There is now scientific concurrence that the most prevalent source of deliberate mercury exposure for the general population is from dental amalgam

and that chronic inhalation of swallowing of amalgam mercury vapor is the major contributor to the total body burden of mercury.<sup>(Summers 1993)3 12 (Goering)6</sup>

While we know that the subclinical effects of lead are very serious, we don't know the extent to which this applies to mercury.<sup>39</sup> We do know that mercury and lead unfortunately enhance each other's toxic effects.<sup>13</sup> A recent paper by two Food and Drug Administration scientists, Goering and Galloway, includes the following statements:

"Recent studies have identified a number of more subtle preclinical effects on the nervous and neuromuscular system, including changes in verbal intelligence and memory, psychomotor disturbances, and abnormal nerve conduction tests...

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However, it is difficult, if not impossible, to identify the lowest threshold for preclinical effects.

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It (mercury) crosses the blood-brain and placental barriers without hindrance.

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The more subtle effects found at lower doses includes preclinical neurological and cognitive disturbances and increase of albumin in urine."

The US EPA banned indoor paints containing mercury because of an inadequate margin of safety for painters and residents, especially children.<sup>12</sup> Paint obviously contributes much less to the total mercury body burden than do mercury/silver fillings. Why has the FDA persisted with the use of dental mercury? Reviewing the evidence which was produced in the FDA Dental Products Panel hearing in 1991 it is hard to imagine how one can conclude that mercury/silver fillings are safe. The Dental Products Panel was so weighted with people involved in the dental profession and the American Dental Association which apparently brought about the presumption that fillings were safe unless proved otherwise.

Mercury in the environment is clearly one of the most toxic naturally occurring elements, considered much more dangerous to human health than arsenic, lead or cadmium.<sup>13</sup> Personal opinions to the contrary, no one can dispute that human exposure to even the lowest doses of mercury should be prevented when possible.<sup>14</sup> "Experiments in primates clearly demonstrate that Hg released from "silver" tooth fillings concentrates in body tissues in amounts sufficient to alter cell function."<sup>15</sup>

Studies have demonstrated that mercury/silver fillings can cause periodontal disease, oral lichen planus, increased resistance to antibiotics, and loss of kidney function in test animals, and,

in all probability, in humans.<sup>3</sup> These problems alone are sufficient to determine that the use of mercury as a filling material is unsafe.

Additionally, autopsy results have shown high levels of mercury in the brains of individuals who died from Alzheimer's disease.<sup>16</sup> Since then there has been a study which has shown that mercury (Hg<sup>2+</sup>) induces a brain reaction in rats similar to those observed in Alzheimer's patients.<sup>17</sup> The University of Kentucky now has a grant to study the possible relationship between Alzheimer's disease and mercury/silver fillings.

Numerous scientists have concluded that dentists and their staff are being poisoned by dental mercury. An increased incidence of spontaneous abortion and decreased fecundability<sup>18</sup> are just two glaring examples of how women working in dentistry are injured because of the FDA failure to properly regulate or ban this implant material. Kidney function of dentists is worse than their comparative workers in cadmium industry.<sup>19</sup> In addition, a variety of scientific<sup>5</sup> and clinical evidence exists implicating mercury from fillings in other health conditions, including neurological disorders.

The dental establishment has been highly critical of the research team of Lorscheider, Vimy and Hahn<sup>3</sup> for using sheep in their studies of the effects of mercury/silver fillings. The criticism revolves around the fact that sheep are ruminants who make heavy use of their teeth and because of the regurgitation process, those teeth are also subject to stomach acids to some extent. What the dental establishment ignores is the fact that sheep were used as a worse-case model and that the fillings were in place in those animals for a very short period of time, particularly when compared to a human life span. Had the experiments with sheep proven no potential for harmful effects from the mercury, but then there would at least be a pretext of scientific research showing the safety of mercury/silver fillings.

Unfortunately, such was not the case. The study showed extensive deposition of mercury in such critical organs as the kidney, liver, and brain. Follow-up studies with sheep showed significant depositions of mercury in the fetus and transmittal via mother's milk. There was an additional and somewhat ludicrous criticism in that the studies did not measure for background levels of radio-active mercury. What those critics failed to take into account was the fact that there is no naturally occurring radio-active mercury so there was no necessity in checking for background levels. The sheep studies were followed by studies in 1990 using primates (Dansher; Hahn).<sup>3</sup>

## B. CLINICAL EVIDENCE

A great deal of clinical evidence exists showing that many health conditions improve upon removal of the mercury/silver

fillings and replacement with non-mercury containing materials. A recent Swedish study titled "Amalgam Exchange - A Road to Better Health?" demonstrated a 33% reduction in annual sick leave just by replacing mercury/silver fillings. The study was conducted by the Health Insurance Bureau in Stockholm County to evaluate the potential of "amalgam exchange" to reduce total health care costs.

Of 383 patients (with mercury/silver fillings) who were chronically ill and on sick leave approximately 65 days a year, seventy-three (73%) percent had their mercury/silver fillings replaced with non-mercury materials. This group demonstrated improvement in all previously reported health symptoms. By the end of the second year after replacement of mercury/silver fillings, annual sick leave had dropped from 65 to 44 days a year.

There are a number of reports published by Godfrey Hanson, Huggins, Pleva, Siblingrud, Stortebecker, Taylor, Zamm, Ziff, etc., in books and journals, many of which are not generally recognized as authoritative by the medical-scientific community, but which nevertheless provide insight into the types of problems which seem to be related to the presence of and alleviated by the removal of mercury/silver fillings.<sup>20</sup>

Two unpublished studies (four copies attached) by dentists, Dr. Pierre Larose in Canada and Dr. Tandlage Henrik Licktenberg in Denmark, also support the conclusion that removal of mercury/silver fillings has beneficial health results. The Danish study included "120 patients suffering from many symptoms that are classically associated with chronic mercury intoxication" who elected to have their mercury/silver fillings replaced with composite fillings in the period 1985-1990. Both a control group and the subjects of the study completed a subjective questionnaire stating their symptoms.

For the group which had their mercury/silver fillings removed, 88% of their symptoms either improved or were eliminated.<sup>21</sup> The Canadian study was similar in that it involved a questionnaire and expands on the results of a report of eighty (80) patients before and after amalgam removal published in Dental & Health Facts, Volume 2, No. 1, 1989. Fifty-seven of eighty patients (71%) who requested the removal of their mercury/silver fillings reported, three months later, some form of improvement in their symptoms.<sup>22</sup>

The FDA Medical Devices Division now has over 700 reports of adverse reaction to mercury/silver fillings. Statements have been made that these reports present a very confusing picture because the symptomatology is undifferentiated. That, of course, is to be expected as over 200 signs and symptoms are caused by mercury according to the scientific literature.<sup>23</sup> Medical texts including Goodman and Gilman, The Pharmacological Basis of Therapeutics and Kaye, Handbook of Emergency Toxicology, list some of the classic symptoms of mercury toxicity as tremors, depression, insomnia, headaches, tachycardia, weight loss, anxiety, lack of self-confidence, memory loss, kidney problems, lack of concentration, loss of energy, constipation, diarrhea and

sensitivity to light. A summary of "Symptom Analysis of Patient Adverse Reaction Reports," compiled by the Foundation For Toxic Free Dentistry (four copies attached) noted startling, consistent improvement of these symptoms upon removal of mercury amalgam fillings. For example, of 165 cases of depression, 155 were improved or cured after amalgam removal. Removal improved memory loss 102 out of 109 times. Kidney problems were improved in 12 out of 12 cases. Similar results were reported by virtually every reported symptom of mercury toxicity.

This is compounded by the fact that in all probability many toxins act in synergistic fashion. Every person in this country who has mercury/silver fillings in their mouth is exposed not only to mercury and alloyed metals but to some extent they are exposed to the plethora of chemicals in our environments which are potentially toxic and most assuredly to lead, considering lead's ubiquitous nature due to past intensive use in gasoline. The synergism, including the potential differentiation in symptoms which may be caused by this chemical and metal soup, is not well understood. It is, however, clear that there is a potential for a great deal of synergism in the toxic effects of lead and mercury.<sup>24</sup> When you couple the Adverse Reaction Reports with the clinical information of the previous paragraph it presents a picture which should be given very serious consideration. While the ADA and other proponents of mercury/silver fillings label this information anecdotal, it is the kind of clinical evidence which should be given credence under the first principle of the scientific method: observation. In this regard the following quote from an editorial in the New England Journal of Medicine (April 1987, p. 1084) is most appropriate:

"Science is a hard taskmaster, and in the light of mounting evidence that suggestions of toxicity are for the most part ultimately confirmed by painstaking scientific inquiry, perhaps it is time to re-examine whether scientific standards of proof of causality - and waiting for the bodies to fall - ought not to give way to more preventive health policies that are satisfied by more realistic conventions and that lead to action sooner."

After years of evidence as to the potential toxicity, we have finally dealt with the issues of asbestos and lead. It took approximately a century after the first questions were raised about the use of mercury in teething powders before mercury was recognized as the cause of acrodynia.<sup>25</sup> Isn't it time we apply the above quote to the use of dental mercury? Recently the National Research Council, a part of the National Academy of Sciences, restated the above principle in a much different way in its 1992 publication Environmental Neurotoxicology (National Academy Press, Washington DC 1992 at page 3:

"Anecdotal reports of neurotoxicity in humans need to be

pursued vigorously with clinical surveillance and follow-up. The incorporation in surveillance systems of the concept of sentinel health events (SHEs) specifically for neurotoxic illnesses should be encouraged."

The National Research Council went on to state at page 4:

"Recognition of the possible environmental origin of neurologic and psychiatric disease is hampered by the inadequate training of most physicians and other health providers in occupational and environmental medicine."

This quote, "...inadequate training of most physicians and other health providers..." may help explain how we have used mercury/silver fillings for 150 years and have so little knowledge, either as to its safety or deleterious effects. This is accentuated by the ubiquitous symptomatology presented by mercury and the lack of clear laboratory indications of its presence in excess. While most physicians are inclined to rely on blood and urine levels, it is very clear from the literature that this is not well placed.<sup>3,26,27</sup> There appears to be little correlation between levels in urine, blood or hair and its toxic effects.<sup>27</sup> Another confounding problem presented by mercury poisoning is that at least in one disease caused by mercury there is a remarkable variation in individual susceptibility as Thomas W. Clarkson, Ph.D., M.D. (Hon.) points out:

"This characteristic was probably responsible for the long delay in identifying mercury as the causative agent of acrodynia. As long ago as the 19th century, pediatricians were well aware that thousands of children were ingesting calomel (mercurous chloride) in teething powders, as a cathartic agent, and in anthelmintic preparations, and that their diapers were often washed with mercury compounds added as fungicides and disinfectants. In the late 1940s pediatricians finally made the connection between mercury and acrodynia. After having been a common childhood scourge, acrodynia became rare... "<sup>28</sup>

There is every reason to believe that the same problem, individual susceptibility as well as variations in effect is delaying our recognition of mercury poisoning from fillings.

### C. NEUROLOGICAL DISORDERS

There are a number of very serious neurological disorders for which the cause is mysterious. The clinical pictures of several of these are most interesting when considered in light of the documented neurotoxicity of mercury and the potential for neurotoxicity from mercury/silver fillings.

## 1. MULTIPLE SCLEROSIS

An interesting example is presented by multiple sclerosis. Multiple sclerosis was first identified in the 19th century during the time in which mercury/silver fillings came into common use. Unpublished anecdotal evidence would seem to indicate that a significant number, but certainly not all, MS victims who have their mercury/silver fillings removed resolve (spontaneous remission) or improve gradually. Of the forty-two victims of MS sending in Adverse Reaction reports 4 were cured and 29 improved. The Multiple Sclerosis Society debunks this theory, but there is toxicological evidence that chronic mercury poisoning (from sources other than fillings) and multiple sclerosis share similar patterns of symptomatology. The Encyclopedia of Occupational Health and Safety discusses the symptoms of chronic mercury poisoning in part as follows:

"Nervous system involvement may occur with or without gastrointestinal symptoms, and may evolve in line with two main clinical pictures: (a) fine-intention tremor reminiscent of that encountered in persons suffering from multiple sclerosis.

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The most frequently encountered symptoms resemble those presented by persons with multiple sclerosis except there are no nystagmus and the two conditions have a different serology and different clinical courses." <sup>29</sup>

Can the other heavy metals which are components of mercury/silver fillings, the silver, copper, tin and zinc, be causing this difference in serology and clinical course? No one knows.

In 1966, Baasch concluded, based on sometimes severe neuroallergic reactions in acrodynia and his own observations on neurologic patients, that multiple sclerosis was an adult form of acrodynia and a neuroallergic reaction, in most cases, caused by mercury from amalgam fillings. <sup>30</sup>

In great detail, Baasch demonstrated that facts concerning the geographical and age distribution, pathological development and symptomatology of MS are all consistent with amalgams as the primary cause of the disease. He reported several specific cases and cited ongoing studies that showed cessation of progression and improvement of resolution of MS after removal of amalgam fillings.

In a very detailed study published in 1978 <sup>31</sup>, a strong correlation ( $P < 0.001$ ) between MS death rates and dental caries was established.

The data show that it is extremely unlikely that this is a chance correlation, and that numerous dietary factors could be ruled out as causative agents.

A hypothesis presented in 1983 by T. H. Ingalls M.D.<sup>32</sup> proposed that slow, retrograde seepage of mercury from root canals or amalgam fillings may lead to multiple sclerosis in middle age. Based on his personal experience, he proposed a correlation of unilateral multiple sclerosis symptomatology with ipsilateral amalgam-filled teeth. He also re-examined the extensive epidemiological data that show in the US and other countries a linear correlation between death rates from MS and numbers of decayed, missing and filled teeth. Ingalls<sup>33</sup> suggested that investigators studying the causes of MS should carefully examine the patients' dental histories. Furthermore, Dr. Ingalls' hypothesis included other environmental exposures to mercury. In 1986, he published data supporting his hypothesis that clearly demonstrate endemic clustering of MS in time and space over a fifty year time span that could be directly correlated to exposure to mercury.<sup>34</sup>

Another study (1987) found that multiple sclerosis patients had eight (8) times the normal level of mercury in their cerebral spinal fluid as compared to neurologically healthy controls.<sup>35</sup>

## **2. AMYOTROPHIC LATERAL SCLEROSIS (ALS) OR LOU GEHRIG'S DISEASE**

Another interesting neurological disorder with unknown etiology is amyotrophic lateral sclerosis (ALS), more commonly known as Lou Gehrig's disease. Like MS, some with ALS have found that their condition improved dramatically upon removal of their mercury/silver fillings. The correlation to mercury exposure was first suggested by Brown in 1954.<sup>36a</sup> A 1961 study of eleven cases of chronic mercurialism from consumption of bread treated with a mercury-containing fungicide presented neurological pictures akin to amyotrophic lateral sclerosis, with some more closely resembling progressive muscular atrophy. The paper concluded:

"1. Since the same causative factor was operative in all these cases, it would appear that amyotrophic lateral sclerosis and progressive muscular atrophy are probably nosologically identical.

2. Amyotrophic lateral sclerosis should not be considered a disease entity but rather a syndrome of variable etiology.

3. Chronic mercurialism is a possible etiologic factor in amyotrophic lateral sclerosis." (emphasis added)<sup>36b</sup>

Two subsequent reports are noteworthy. A 1978 report by Barber involved two employees in a mercury oxide manufacturing plant who developed neurological changes resembling ALS.<sup>37</sup> In a 1983 report in JAMA a 54-year-old man had symptoms resembling ALS after a brief but intense exposure to elemental mercury which resolved

afterwards.<sup>38</sup>

From this we cannot say absolutely that mercury from fillings causes either MS or ALS, but it certainly appears to be a factor. To those who have seen their symptoms improve or resolve this may seem ridiculous but the available scientific evidence is inconclusive and more research must be done. More importantly, the converse cannot be proven. That is, that mercury/silver fillings are safe. Congress has placed a burden upon the FDA and the manufacturers which they have not met.

#### **D. HYPERSENSITIVITY OR ALLERGIC REACTIONS VS TOXICITY**

While the real problem is from the toxicity of mercury, the issue of hypersensitivity must be addressed. The ADA and FDA, while ignoring the evidence of toxicity, admit that 1% of the U.S. population may be hypersensitive to mercury/silver fillings. Although their figure is invalid and not based on any scientific study or epidemiological data, utilizing their statement would still place upwards of a million people at risk. Scientific studies demonstrate at least a 5-11% allergic response to mercury and perhaps much higher.<sup>40</sup> We must be aware that no studies have been found about the sub-clinical toxic effects of mercury, particularly in this sensitive group. However, as Lars Friberg, M.D., Ph. D., has testified on this issue to the FDA:

"A special problem is the fact that mercury can give rise to allergic anti-immunotoxic (sic) reactions which are partially genetically regulated."<sup>41</sup>

Manufacturers of mercury/silver fillings and the FDA face a dilemma regarding this evidence of hypersensitivity to mercury. The percentages are so high that action is required but apparently there is no standard of care within dentistry or medicine for testing for hypersensitivity.<sup>42</sup> While Petitioners state that toxicity is much more of a problem than hypersensitivity, nevertheless, hypersensitivity should not be overlooked.

## THE DENTIST'S DILEMMA

A 1973 textbook on oral pathology states:

"A toxic reaction from absorption of mercury in dental amalgam has been reported on a number of occasions."<sup>43</sup>

Yet the ADA persists in assuring the public, dentists, and particularly its members that the scientific evidence indicates amalgam fillings are safe with statements such as the following:<sup>1</sup>

"Why is the ADA so confident that amalgam is safe? The strongest and most convincing support we have for the safety of dental amalgam is the fact that each year more than 100 million amalgam fillings are placed in the United States. And since amalgam has been used for more than 150 years, literally billions of amalgam fillings have been successfully used to restore decayed teeth."<sup>44</sup>

Most dentists rely on the standard of care to protect them, but the alternative theory known as the "material risk approach"<sup>45</sup> and specific cases on informed consent raise serious questions as to whether or not this will suffice on the question of the use of dental mercury with an individual patient. Two cases have suggested that when faced by a direct question by the patient, the health care provider must research the question and disclose to the patient current scientific information. In other words, a disclosure of reasonable, foreseeable risk is not sufficient if the patient inquires concerning any and all risks, at which time a complete disclosure is required.<sup>46</sup>

Given the fact that individuals with mercury/silver fillings receive a considerable dose of mercury<sup>3;6</sup>, a highly toxic heavy metal, it is important to limit that exposure. Since mercury/silver fillings have a limited longevity, removal and replacement is foreseeable. From the literature there appears to be a significant exposure both at placement and removal of mercury/silver fillings, but the level of that exposure has not been adequately quantified. There are concerns about the lack of a standard of care in both the placement and removal of mercury/silver fillings in order to minimize exposure. The American Dental Association calls for the use of water spray and evacuation, however, that method cannot necessarily be said to be the standard of care. Many dentists simply grind out mercury/silver fillings with an amalgam removing diamond drill, which tends to pulverize the material, releasing a great deal of mercury and maximizing exposure. Obviously methods of isolation, debris removal and high volume evacuation can limit patient exposure.<sup>47</sup> Because of the lack of a clear efficacious standard of care it is incumbent upon the FDA and the manufacturers of mercury/silver fillings to establish a protocol for its removal which will minimize exposure to the patient.

### ENVIRONMENTAL IMPACT

Dental mercury has a tremendous negative environmental impact which was ignored at the time of its classification in 1987. Estimates are that two million pounds of mercury have gone into the environment of the United States over the last 15 years. This amounts to over 130,000 pounds per year and over 350 pounds per day.<sup>48</sup> A most frequent recipient of this mercury is the waterways of this country. Unfortunately, in aqueous systems, mercury's presence is magnified by aquatic life as the small organisms & fish filtrate the water, they also filtrate the mercury. As a consequence, mercury can be toxic at extremely low levels. Clean Water Action has recently published a report pointing out that one pound of mercury is sufficient to contaminate a lake with an eighteen square mile surface area. Dental mercury contributes approximately 350 pounds per day to the environment. For the sake of argument, assuming that one-half of that amount is dispersed in a lake, it would contaminate a lake with over 3,000 square miles of surface area each day.<sup>49</sup>

### STATEMENTS BY FDA OFFICIAL

Perhaps the strongest evidence of this lack of proof of safety comes from statements made by an FDA official as excerpted from a newspaper February 25, 1992:

Despite safety reassurances from the dental profession and two federal panels, leading toxicologists yesterday said evidence still points to mercury in amalgam dental fillings as a potentially serious health threat.

A Food and Drug Administration official, speaking at a Seattle meeting of the Society of Toxicology, drew parallels between the evidence against lead poisoning 20 years ago and the evidence against mercury today. Lead has since been proven harmful to humans and removed from paint, pipes and many other materials.

New evidence indicates a need for more vigorous study of the possible risk posed by the release of mercury vapor from "silver" amalgam fillings, said Dr. Don Galloway, a scientist with the FDA's Center for Devices and Radiological Health in Rockville, Md.

Making an analogy to lead poisoning, he said the rule of thumb for safety in lead exposure used to be the point at which exposure caused obvious physical symptoms. But studies have since shown that chronic exposure to even low levels of lead, especially in children, can cause significant developmental and neurological damage.

Lead was removed from paint in 1971, Galloway said.

Mercury was removed from paint in 1991, he noted, asking the toxicology group meeting at the Washington State Convention and Trade Center yesterday to consider if there is a 20- year lag between understanding mercury toxicity compared with lead toxicity. \*\*\*

There are some striking similarities in the history, he said.<sup>39</sup>

Two conclusions must be drawn from this statement. The first is that studies need to be done regarding the possible risks of mercury/silver fillings. The second, naturally following from the first, and more chilling aspect is that the safety of mercury/silver fillings has not been proven as Congress intended in the Medical Devices Act of 1976, and the FDA persists in doing nothing about it.

Given the plethora of scientific data calling into question the continued use of mercury/silver fillings it is hard to see how the FDA, not to exclude the manufacturers of mercury/silver fillings, the American Dental Association, the National Institutes of Health, including the National Institute of Dental Research have continued to allow the unfettered use of mercury in dentistry without at least explicit warnings regarding the potential for hypersensitivity. At the time of the approval by the FDA of dental mercury in August of 1987, the panel made reference only to three (3) articles dealing with hypersensitivity, ignoring other articles dealing with hypersensitive reaction and also ignored many other articles that called into question the use of dental mercury on other grounds, particularly the high toxicity. As Dr. Thomas W. Clarkson has said, "Many important medical questions concerning mercury toxicity remain to be answered."<sup>28</sup> We know the use of mercury/silver fillings is unsafe, we just do not know to what extent.

#### FOREIGN ACTION

An ad hoc committee (called the Expert Commission) of eminent scientists, formed by the Swedish government to consider this issue, found that mercury/silver fillings were unsuitable from a toxicological standpoint and suggest its use be discontinued in pregnant women. The Expert Commission went on to recommend that all use of mercury/silver fillings be discontinued when a suitable replacement could be found. In 1990, the Swedish government passed a law requiring the National Health Insurance System to pay part of the costs of replacing mercury/silver fillings when medically indicated. Recently the Swedish Public Health Department submitted a plan to the government calling for all use of mercury/silver fillings to be stopped by 1997.

Germany, on March 1, 1992, published a special directive limiting the use of mercury/silver fillings to chewing surfaces in posterior teeth; eliminating the use of mercury/silver fillings for root or retrograde fillings; stopping the placement of mercury/silver fillings in children up to 6 years of age and in the teeth of pregnant women; and stipulating that mercury/silver

fillings should not be placed in the teeth of anyone with kidney problems.

### CONCLUSION

It will probably be some years before medical scientists have unraveled all the harm which mercury from dental fillings is causing. That is not surprising considering its ubiquitous nature as a poison and the fact that most medical doctors have been exposed only to the positions of the ADA and FDA on the safety of mercury/silver fillings. Apparently there are second thoughts within the FDA, as you can see from the newspaper article containing statements Dr. Don Galloway of the FDA's Center for Devices & Radiological Health.<sup>39</sup> No scientific data has ever been presented which has established liquid mercury as a safe implant material. A number of studies are ongoing that will probably provide further support for the scientific argument against the use of mercury in dentistry. The scientific and clinical information should be considered in light of the guiding principle of medicine - "first do no harm."

### CERTIFICATION TO LACK OF UNFAVORABLE DATA AND INFORMATION

The undersigned certify that to the best knowledge and belief of the undersigned, this petition includes all information and views on which the petition relies. Data and information known to the petitioners which are unfavorable to the petition are contained in the Final Report of the Public Health Service, dated January 15, 1993, "Dental Amalgam, Recommended PHS Strategy for Research, Education and Regulation." The Final Report is marred by scientific contradictions, unsupported conclusions, omissions, inconsistent interpretations and proposes regulatory inconsistencies. The Final Report offers a classic case study of how the PHS and ADA's desire to diminish public concern about the safety of dental amalgam restorations hinders the FDA's mission.

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<sup>1</sup> FDA Transcript 3/15/91, p.81

<sup>2</sup> IAOMT response to the positions taken by the ADA. IAOMT, PO Box 458, Ortonville, Michigan 48462.

<sup>3</sup> APOSHIAN, HV; BRUCE, DC; ALTER, W; DART, RC; HURLBUT, M; APOSHIAN, MM. (Apr 1992): Urinary mercury after administration 2,3-dimercaptopropane-1-sulfonic acid: correlation with dental amalgam score. FASEB J 6(7):2472-2476.

APP, GR. (1961): Effect of Silicate, Amalgam and Cast Gold on the Gingiva. J Prosth Dent. 11(3):522-32.

BASS, MH. (1943): Idiosyncrasy to Metallic Mercury, With special Reference to Amalgam Fillings in the Teeth. J Pediatr. 23:215-218.

BERLIN, M; HUA, J; LOGDBERG, B; WARVINGE, K. (1992): Prenatal Exposure to Mercury Vapor: Effects on Brain Development. The Toxicologist. 12(1):7(A-245).

BLOCH, P; SHAPIRO, IM. (1982): Summary of the International Conference on Mercury Hazards in Dental Practice. JADA. 104:489-90.

BLUMENTHAL, F. AND JAFFEE, K. (1929): Amalgamplomben als Ursache von Quecksilberdermatitis, Deutsche med. Wchnschr. 55:1720, (October 11).

BOLEWSKA, J; HOLMSTRUP, P; MOLLER-MADSEN, B; KENRAD, B; DANSCHER, G. (1990): Amalgam Associated Mercury Accumulations in Normal Oral Mucosa, Oral Mucosal Lesions of Lichen Planus and Contact Lesions Associated with Amalgam. J Oral Path Med. 19:39-42.

BOYD, ND; BENEDIKTSSON, H; VIMY, MJ; HOOPER, DE; LORSCHIEDER, FL. (1991): Mercury from Dental "Silver" Tooth Fillings Impairs Sheep Kidney Function. Am J Physiol. 261(RICP 30):R1010-4.

COOK, TA; YATES, PO. (1969): Fatal Mercury Intoxication in Dental Surgery Assistant. Br Dent J. 127:553-5.

DANSCHER, G; HORSTED-BINDSLEV, P; RUNGBY, J. (1990): Traces of Mercury in Organs from Primates with Amalgam Fillings. Exper Molec Path. 52:291-9.

DJERASSI, E; BEROVA, N. (1969): The Possibilities of Allergic Reactions from Silver Amalgam Restorations. Int Dent J. 19(4):481-8.

DUXBURY, AJ; EAD, RD; MCMURROUGH, S; WATTS, DC. (1982) Allergy to mercury in dental amalgam. Br. Dent J. 152(2):47.

EGGLESTON, DW. (1984): Effect of Dental Amalgam and Nickel Alloys on T-Lymphocytes: Preliminary Report. J Prosth Dent. 51(5):617-23.

EGGLESTON, DW; NYLANDER, M; SUFFIN, SC; MARTINOFF, JT; RIEDERS, MF. (1987): Correlation of Dental Amalgam with Mercury in Brain Tissue. J Prosth Dent. 58:704-7.

EIDE, R; BJUGN, P; WESENBERG, GR. (1992): Autometallographic Demonstration of Mercury in Rat Molars. J Dent Res. 71 Special Issue, p 586, A565.

FINNE, K; GORANSSON, K; WINCKLER, L. (1982): Oral Lichen Planus and Contact Allergy to Mercury. Int J Oral Surg. 11:236-9.

FISHER, D; MARKITZIU, A; FISHEL, D; BRAYER, L. (1984): A 4 Year Follow-up Study of Alveolar Bone Height Influenced By Two

Dissimilar Class II Amalgam Restorations. J Oral Rehab. 11(4):399-405.

FLEISCHMANN, P. (1928) Deutsche med. Wchnschr. 1:304.

FLEISCHMANN, P. (1938) Cited in Objections to the Use of Amalgam for Filling Teeth, Foreign Letter (Berlin), JAMA. 90:1056.

FREDEN, H; HELLDEN, L; MILLEDING, P. (1974): Mercury Content in Gingival Tissues Adjacent to Amalgam Fillings. Odont Rev. 25:207-10.

FRIBERG, L; KULLMAN, L; LIND, B; NYLANDER, M. (1986): Kvicksilver i Central Nervsystemet i Relation Till Amalgamfyllningar. Lakartidningen. 83:519-22.

GOERING, P.L., GALLOWAY, W.D., CLARKSON, T.W., LORSCHIEDER, F.L., BERLIN, M., AND ROWLAND, A.S. (1992). Toxicity Assessment of Mercury Vapor from Dental Amalgams. Fundam. Appl. Toxicol. 19, 319-329.

GOLDSCHMIDT, PR; COGEN, RB; TAUBMAN, SB. (1976): Effects of Amalgam Corrosion Products on Human Cells. J Period Res. 11:108-15.

HAHN, LJ; KLOIBER, R; VIMY, MJ; TAKAHASHI, Y; LORSCHIEDER, FL. (1989): Dental "Silver" Tooth Fillings: A Source of Mercury Exposure Revealed by Whole-Body Image Scan and Tissue Analysis. FASEB J. 3:2641-6.

HAHN, LJ; KLOIBER, R; LEININGER, RW; VIMY, MJ; LORSCHIEDER, FL. (1990): Whole-Body Imaging of the Distribution of Mercury Released from Dental Fillings into Monkey Tissues. FASEB J. 4:3256-60.

JAMES, J; FERGUSON, MM; FORSYTH, A; TULLOCH, N; LAMEY, P-J. (1987): Oral Lichenoid Reactions Related to Mercury Sensitivity. Br J Oral Maxillofac Surg. 25:474-480.

KATSUNUMA, T; IIKURA, Y; NAGAKURA, T; SAITOH, H; AKIMOTO, K; AKASAWA, A; KINDAICHI, S. (1990): Exercise-Induced Anaphylaxis: Improvement after Removal of Amalgam in Dental Caries. Ann Allergy. 64:472-5.

LAINE, J. et al. (1992): Resolution of Oral Lichenoid Lesions After Replacement of Amalgam Restorations in Patients Allergic to Mercury Compounds. JAMA 267(21): 2880, June 3, 1992.

LORSCHIEDER, FL; SUMMERS, AO; MAGNER, PO; VIMY, MJ. (1992): Mercury from Amalgam Tooth Fillings: Its Tissue Distribution and Effects on Cell Function. The Toxicologist. 12(1):7(A-244).

LUNSTROM, IM. (1984): Allergy and corrosion of dental materials in patients with oral lichen planus. Int J Oral Surg. 13:16.

MALMSTROM, C; HANSON, M; NYLANDER, M. (1992): Amalgam-Derived Mercury in Feces. Conference on Trace Elements in Health and Disease. Stockholm, Sweden, May25-29, 1992.

MEYER E. (1930): Quecksilbervergiftungen von Zahnfüllungen ausgehend, Med. Welt. 4:703, (May 17).

MILLER, EG; PERRY, WL; WAGNER, MJ.. (1987): Prevalence of Mercury Hypersensitivity in Dental Students. J Prosth Dent. 58(2):235-7.

MOBACKEN, H; HERSLE, K; SLOBERG, K; THILANDER, H. (1984): Oral Lichen Planus: Hypersensitivity to Dental Restoration Material. Cont Derm. 10:11-15.

NYLANDER, M. (1986): Mercury in pituitary glands of dentists. Lancet, Feb 22, p 442.

NYLANDER, M; FRIBERG, L; BIRGER, L. (1987): Mercury Concentrations in the Human Brain and Kidneys in Relation to Exposure from Dental Amalgam Fillings. Swed Dent J. 11:179-87.

ÖSTLIN, L. (1991): Amalgam Removal - A Road to Better Health? Health Insurance Bureau. Stockholm County, Sweden.

RECHMANN P. (1992): LAMMS and ICP-MS Detection of Dental Metallic Compounds in Not-discoloured Human Gingiva. J Dent Res. 71 Special Issue. P599, A672.

ROWLAND, A; BAIRD, D; WEINBERG, C; SHORE, D; SHY, C; WILCOX, A. (1992): Reduced Fertility Among Dental Assistants With Occupational Exposure to Mercury. The Toxicologist. 12(1):7(A-246).

SACHER, H. Zwei ungewöhnliche Fälle vpm Scjwer,eta;stp,atotos. Ztschr. f. Hals-, Nasen- u. Ohrenh. 30:433, (May).

SANCHES SOTRES, L; VAN HUYSEN, G; GILMORE, H. (1969): A Histological Study of Gingival Tissue Response to Amalgam, Silicate and Resin Restorations. J Period. 40:543-6.

SCHWARZKIPF, H. (1959): Zahnärztliche Materialien und Krebs (Dental materials and cancer). Erfahrungsheilkunde 10:489-493.

SHAFFER, WG; HINE, MK; LEVY, BM. A Textbook of Oral Pathology. Pp. 443-5. W.B. Saunders Co. Philadelphia. 1958.

SHAPIRO, IM; SUMNER, AJ; SPITZ, LK; CONRBLATH, DR; UZZELL, B; SHIPP, II; BLOCH, P. (1982): Neurophysiological and Neuropsychological Function in Mercury-exposed Dentists. Lancet. 8282:1147-50.

SHIPP, II; SHAPIRO, IM. (1983): Mercury Poisoning in Dental Practice. Comp Cont Educ. 4:107-10.

SIBLERUD, RL. (1989): The Relationship Between Mercury from Dental Amalgam and Mental Health. Amer J Psychother. 43(4):575-87.

SIBLERUD, RL. (1990): The Relationship Between Mercury from Dental Amalgam and Oral Cavity Health. Ann Dent. 49(2):6-10.

SIBLERUD, RL. (1990): The Relationship Between Mercury from Dental Amalgam and the Cardiovascular System. Sci Tot Environ. 99:23-35.

SIBLERUD, RL. (1992): A Comparison Of Mental Health Of Multiple Sclerosis Patients With Silver/Mercury Dental Fillings And Those With Fillings Removed. Psychological Reports, 70:1139-1151.

SKARE, I; ENGQVIST, A. (1992): Amalgam restorations - an important source to human exposure of mercury and silver. LAKARTIDNINGEN 15:1299-3101.

STOCK, A. (1926).Med. Klin. 2:1209.

STOCK, A. (1936-1937) Arch. f. Gewerbepath. u. Gewerbehyg. 7:388.

SUMMERS, AO; WIREMAN, J; VIMY, MJ; LORSCHIEDER, FL. (1990): Increased Mercury Resistance in Monkey Gingival and Intestinal Bacterial Flora after Placement of Dental "Silver" Fillings. The Physiologists. 33:A-116.

SUMMERS, AO; WIREMAN, J; TOTIS, PA; BLANKENSHIP, J; VIMY, MJ; LORSCHIEDER, FL. (1991): Mercury Released from Dental "Silver" Fillings Increases the Incidence of Multiply Resistant Bacteria in the Oral and Intestinal Normal Flora. 1991 Am. Soc. Microbiol Ann Mtg:A-137.

SUMMERS, AO; WIREMAN J; VIMY MJ; LORSCHIEDER FL; MARSHALL B; LEVY SB; BENNETT S; BILLARD L. (1993): Mercury released from dental "silver" fillings provokes an increase in mercury and antibiotic resistant bacteria in the primate oral and intestinal flora. Antimicrobial Agents & Chemotherapy, 37:825-834..

TAKAHASHI, Y; TSURUTA, S; HASEGAWA, J; KAMEYAMA, Y. (1992): Number of Amalgam Fillings in Pregnant Rats and Mercury Concentration in Their Fetuses. J Dent Res. Vol 71 Special Issue, p 571, A445.

TAKAHASHI Y; TSURUTA S; HASEGAWA j; KAMEYAMA Y. (1992): Mercury Content in Tissues of Pregnant Rats with Dental Amalgam. J Dent Res 71 (Div Abstracts: Scandinavian Div), April 1992.

TASKINEN, H; KINNUNEN,E; RIIHIMÄKI, V. (1989): A Possible case of

mercury-related toxicity resulting from the grinding of old amalgam restorations. Scand J Work Environ Health, 15:302-304.

TRAUB, EF; HOLMES, RH. (1938): Dermatitis and Stomatitis from the Mercury of Amalgam Fillings. Arch Derm Syph. 38:349-357.

TRIVEDI, SC; TALIM, ST. (1973): The Response of Human Gingiva to Restorative Materials. J Prosth Dent. 29(1):73-80.

TROTT, JR; SHERKAT, A. (1964): Effect of Class II Amalgam Restorations on Health of the Gingiva: A Clinical Survey. J Can Dent Assoc. 30(12):766-70.

TURGEON, J; LEMAY, L-P; CLEROUX, R. (1972): Periodontal Effects of Restoring Proximal Tooth Surfaces with Amalgam: A Clinical Evaluation in Children. J Can Dent Assoc. 37:255-6.

UZZELL, BP; OLER J. (1986): Chronic low-level mercury exposure and neuropsychological functioning. J Clin Exp Neuropsych. 8(5):581-593.

VIMY, MJ; TAKAHASHI, Y; LORSCHIEDER, FL. (1990): Maternal-Fetal Distribution of Mercury (203Hg) Released from Dental Amalgam Fillings. Am J Physiol. 258(RICP 27):R939-45.

VIMY, MJ; BOYD, ND; HOOPER, DE; LORSCHIEDER, FL. (1990): Glomerular Filtration Impairment by Mercury Released from Dental "Silver" Fillings in Sheep. The Physiologists. 33:A-94.

WEAVER, T; AUCLAIR PL; TYBOS GM. (1987) An amalgam tattoo causing local and systemic disease. Oral Surg. Oral Med. Oral Pathol. 63:137-140.

WHITE, RR; BRANDT, RL. (1976): Development of Mercury Hypersensitivity Among Dental Students. JADA. 92:1204-7.

WORLD HEALTH ORGANIZATION. (1991): Environmental Health Criteria 118: Inorganic Mercury. Geneva.

ZAMM, AV. (1990): Removal of dental mercury: Often an effective treatment for the very sensitive patient. J Ortho Med. 5(3):138-142.

ZANDER, HA. (1957): Effect of Silicate Cement and Amalgam on the Gingiva. JADA. 55:11-15.

ZANDER D; EVERS U; FREIER I; BROCKHAUS A. (Feb 1992): Studies on human exposure to mercury .3. DMPS induced mobilisation of mercury in subjects with and without amalgam fillings. Zentralblatt Fur Hygiene und Umweltmedizin 192:5.

<sup>4</sup> World Health Organization (1991) "Environmental Health Criteria 118: Inorganic Mercury", Geneva.

<sup>5</sup> FDA Transcript 3/15/91, pp. 67-70.

<sup>6</sup> Aposhian HV et al. Urinary mercury after administration of 2,3-dimercaptopropane-1 sulfonic acid: Correlation with dental amalgam score. FASEB J 6(6):2472-2476, April 1992.

Zander D. et al. Studies on human exposure to mercury .3. DMPS induced mobilization of mercury in subjects with and without amalgam fillings. Zentralblatt fur Hygiene und Umwelmedizin 192(5):447-454, Feb 1992.

Skare I, Engqvist A. Amalgam restorations - an important source of human exposure to mercury and silver. LAKARTIDNINGEN 15:1299-1301, 1992.

Goering, P.L., Galloway, W.D., Clarkson, T.W., Lorscheider, F.L., Berlin, M., and Rowland, A.S. (1992). Toxicity Assessment of Mercury Vapor from Dental Amalgams. Fundam. Appl. Toxicol. 19, 319-329.

- <sup>7</sup> Grant, N. (1969). Legacy of the mad hatter. Environment, 11, 18-23, 43, 44.
- <sup>8</sup> Landrigan, P.J. (1982). Occupational and community exposure to toxic metals: Lead, cadmium, mercury and arsenic. The Western Journal of Medicine, 137, 531-538.
- <sup>9</sup> Craig, RG;et al. Dental Materials: Properties and Manipulation. pg. 78 CV Mosby. St. Louis. 1975
- <sup>10</sup> Chase, HS, M.D., D.D.S. Some Observations and Experiments Connected With Oral Electricity. Amer J. Dental Science. Vol. 12:18-23. 1878-79.] [Phillips, RW. Skinner's Science of Dental Materials. 7th Ed. WB Saunders Co. 1973]
- <sup>11</sup> Clarkson TW, Friberg L, Nordberg GF, Sager PR, eds. Biological monitoring of toxic metals. New York: Plenum Press, 1988. National Academy of Sciences, "An Assessment of Mercury in the Environment", Washington, D.C. 1978, p. 84.
- <sup>12</sup> Malmstrom, C., M. Hansson and M. Nylander. 1992. Amalgam-derived mercury in feces. J. trace element exp. MD 5:122.
- <sup>13</sup> Sharma RP and Obersteiner EJ. Metals and Neurotoxic effects: Cytotoxicity of selected metallic compounds on chick ganglia cultures. J. Comp. Path. Vol 91:235-244, 1981.
- <sup>14</sup> Mercury Health Effects Update: Health Issue Assessment. EPA-600/8-84-019F. Aug 1984.
- <sup>15</sup> Letter from Drs. Lorscheider and Vimy, Vol. 337: May 4, 1991, The Lancet, page 1103.
- <sup>16</sup> (a) Wenstrup, D; Ehmann, Wd; Markesbery, WR Trace Element Imbalances in Isolated Sub cellular Fractions of Alzheimer's Disease Brains. Brain Research. 553:125-31. 1990.  
(b) Ehmann, W.E., et al. Biol. Trace Elem. Res. 13:19-33. 1987.  
(c) Ehmann, W.D. et al. Brain Trace Element Analyses with instrumental NAA Neurotoxicology. 7:197-206. 1976.
- <sup>17</sup> Duhr E. et al, FASEB 75th Annual Meeting, Atlanta, Georgia, April 21-25, 1991. Abstract #493.
- <sup>18</sup> Rowland A, Baird D, Weinberg C, Shore D, Shy C and Wilcox A. Reduced Fertility Among Dental Assistants with Occupational Exposure to Mercury; National Institute of Environmental Health Sciences, Research Triangle, NC (Abstract The Toxicologist 31st Annual Meeting Vol 12 #1 February 1992).
- <sup>19</sup> Verschoor MA, Herbert RFM, Zielhuis RL; Urinary mercury levels and early changes in kidney function in dentists and dental assistants; Community Dentistry and Oral Epidemiology Vol 16 #3 June 1988.

<sup>20</sup> These citations are not listed here but will be furnished to the Court and/or copies of the articles upon request.

<sup>21</sup> Lichtenberg, Tandlaege Henrik, Torvet 1A, 3400 Hillerod, Denmark. Elimination of Symptoms by Removal of Dental Amalgam from Mercury Poisoned Patients, as Compared with a Control Group of Average Patients. (Unpublished) Copy attached.

<sup>22</sup> Larose, Dr. Pierre, St-Laurent, Quebec. The Effect Of Amalgam Removal on 37 Health Symptoms In Humans (1992 - unpublished). Copy attached.

<sup>23</sup> See pp. i-iii of a mercury bibliography with approximately 12,000 references. Available for \$43.00 including shipping from Bio-Probe, Inc., P.O. Box 608010, Orlando, FL 32808-8010. If requested this will be furnished to the Court of Appeals at no charge.

<sup>24</sup> Schubert, Jack et al. Combined effects in Toxicology - a rapid systematic testing procedure: Cadmium, Mercury, and Lead, Journal of Toxicology & Environmental Health, vol 4:763.776, 1978.

<sup>25</sup> Warkany, J. Acrodynia - Postmortem of a disease. Amer. J. Dis. Child. 112, 1966. 147-156.

<sup>26</sup> Bell ZG Jr, Lovejoy HB, Vizena TR. Mercury exposure evaluations and their correlation with urine mercury excretions. 3. Time-weighted average (TWA) mercury exposures and urine mercury levels. J Occup Med 1973; 15:501-8.

<sup>27</sup> (a) Goldwater, LJ, Ladd, AC, & Jacobs, MB. Arch. Envir. Health, 1964)

(b) NIDR/ADA Workshop on Biocompatibility of Metals in Dentistry. Journ. American Dental Assoc. Vol. 109. September, 1984.

<sup>28</sup> Clarkson, TW. New Eng. J. Med. 323:1137-1139 (October 18, 1990).

<sup>29</sup> Encyclopedia of Occupational Health and Safety, (3rd revised edition 1983). Parmeggiani, L., Technical Editor, pp. 1334-1335.

<sup>30</sup> Baasch, E. Theoretische Ueberlegungen zur Aetiologie der Sclerosis multiplex. Die Multiple Sklerose eine Quecksilberallergie? Schw. Arch. Neurol. Neurochir. Psychiat. 98, 1966, 1-18.

<sup>31</sup> Craelius, W. Comparative epidemiology of multiple sclerosis and dental caries. J. Epidemiol. Comm. Health 32:155-165, 1978.

<sup>32</sup> Ingalls, T.H. Epidemiology, etiology, and prevention of multiple sclerosis. Hypothesis and fact. Am. J. Forensic Med. Pathol. 4:55-61, 1983.

<sup>33</sup> Ingalls, T.H. Triggers for multiple sclerosis. Lancet, xx:160, 1986.

<sup>34</sup> Ingalls, T.H. Endemic clustering of multiple sclerosis in time and place, 1934-1984. Am. J. Forensic Med. Pathol. 71:3-8, 1986.

<sup>35</sup> Ahlrot-Westerlund, B. "Multiple Sclerosis and Mercury in

Cerebrospinal Fluid". Second Nordic Meeting on Trace Elements in Human Health and Disease. Odense, Denmark. 17-21 Aug 1987.

<sup>36a</sup> Brown, I.A. Chronic Mercurialism, a cause of the clinical syndrome of amyotrophic lateral sclerosis. *AMA Arch. Neurol Psych* 72:674-681, 1954.

<sup>36b</sup> Kantarjian, AD: A syndrome clinically resembling amyotrophic lateral sclerosis following chronic mercurialism. *Neurology* 11:639-44, 1961.

<sup>37</sup> Barber TE: Inorganic mercury intoxication reminiscent of amyotrophic sclerosis. *J. Occupat. Med.* 20:667-9, 1978.

<sup>38</sup> Adams CR, Ziegler DK, Lin JT: Mercury intoxication simulating amyotrophic lateral sclerosis. *J. Amer. Med. Assoc.* 250:642-3, 1983.

<sup>39</sup> February 25, 1992 article by Paulson in Seattle Post-Intelligencer, "Danger in Fillings Indicated" regarding meeting of Society of Toxicology.

<sup>40</sup> See references by (a) Djerassi, (b) Miller, and (c) White, per footnote #5.

<sup>41</sup> FDA Dental Products Panel Meeting. March 15, 1991. pp. 72-73. (The transcript refers to "anti"-immunotoxic which is believed to be a transcription error.)

<sup>42</sup> NIDR maintains that hypersensitivity is rare, appears within a relatively short period of time, is usually localized, and "can be determined through a skin patch test performed by an allergist or dermatologist". (NIDR Research Digest, February 1991). In contrast, the facts indicate that mercury patch testing has generally been dropped by physicians, and there never was a clear protocol established for the patch test when it was in use. (Robert E. Reeves' personal conversation July 1992 with William Sellars, M.D., Board Certified Immunologist, Dallas, Texas.)

<sup>43</sup> Shafer, WG; et al. *A Textbook of Oral Pathology*. WB Saunders Co. Philadelphia. 1973.

<sup>44</sup> J Amer Dent Assoc., When Your Patients Ask About Mercury in Amalgam. 120:396. April 1990.

<sup>45</sup> Council on insurance. Informed consent: a risk management view. JADA, Vol. 115:630-635, 1987.

<sup>46</sup> *Herbeson v. Parke-Davis, Inc., et al*, 746 Fed 2d 517, 525 (9th Circuit 1984). *Mason v. Ellsworth*, Wash. Appl, 474 P.2d 909, 919 (1970). C & 61 Am. Jur.2d, Physicians, Surgeons, etc., sec. 189.

<sup>47</sup> Reinhardt, J.W., et al. Exhaled mercury following removal and insertion of amalgam restorations. Journal of Prosthetic Dentistry, 49:652-656, 1983.

<sup>48</sup> Bio-Probe Newsletter. Vol. 8, No. 5. September 1992, pages 1-4.

<sup>49</sup> Clean Water Action, Mercury Warning: The Fish You Catch May Be Unsafe To Eat, Washington, D.C. 1992.

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