SPECIAL ISSUE

<<< THE MYTH'S AND THE FACT'S >>>

BY

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REBUTTALS TO:

   Mercury in Dental Fillings: Is There a Problem? R.S. Baratz.

2. CONSUMER REPORTS. 51 (3), MARCH 1986.
   The Mercury Scare: If a dentist wants to remove your fillings because they contain mercury, watch your wallet.


   Dental Amalgam: Filling Dental Health Care Needs.

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The Bio-Probe Newsletter is published bi-monthly
Editorial office located at 4401 Real Ct., Orlando, FL 32808
Subscription price $65.00 per year. Postage paid at Orlando
REBUTTAL

The controversy over the use of dental mercury amalgam fillings has now achieved such international attention that medico-legal considerations dictate the requirement for valid scientific documentation supporting the respective positions. The antagonists in this issue will ultimately be held responsible for their public statements.

Two articles, an A.D.A. pamphlet and a recent research study are being utilized by the pro-amalgam advocates in defense of their position that the mercury amalgam fillings are harmless to patients and that there is no reason to discontinue their use. These four documents have considerable potential for influencing the health of untold numbers of patients. It is, therefore, absolutely imperative that the scientific validity of these documents be examined and evaluated. These four widely disseminated and quoted documents are:


In order to evaluate the scientific validity of these documents an attempt to distinguish between opinions and scientifically supportable facts must be made by delineating that which has been scientifically documented.

THE ANTI-AMALGAM POSITION

Insofar as the anti-amalgam position is concerned, the following factors have been scientifically validated:

1. Dental mercury amalgam fillings do contain elements that are toxic to human tissue.(1,2) Although silver, copper and tin may also be toxic, the major concern has been directed to mercury, which is universally acknowledged to be an extremely poisonous element.(3) The research of Sharma and Obersteiner in 1981 found mercury to be more poisonous than lead, cadmium, and even arsenic.(4) Mercury vapor, because of its extremely high rate and rapidity of absorption by inhalation, is considered to be far more toxic than metallic mercury itself.(5,6)
2. Mercury vapor is released from dental amalgam fillings, particularly when they are subjected to functional stimulation such as chewing, toothbrushing, and hot fluids. (7-11) The release of mercury in ion form has also been well demonstrated in vitro and in vivo. (12)

3. The slow half-time excretion rate of mercury guarantees that multiple daily exposures, albeit in small doses, will result in a gradual accumulation of mercury in body tissues. (13, 14)

4. The minimum amount of mercury that will not cause significant human tissue damage is unknown. (15-16) The current established toxic thresholds (TLV, MAC, OEL, PEL, etc.) for mercury are all merely estimates of mercury exposures that will cause clinically observable signs and symptoms of neurological damage in adult workers in a 40-hour per week industrial environment and have no applicability to subclinical pathology (17-20).

5. The measurement of mercury levels in the urine or blood does not correlate to the body burden or toxic effects of mercury. (22-26) This fact negates the validity of studies and statements that attempt to justify the harmlessness of dental amalgam fillings based on measurements of mercury in urine or blood.

The opponents of dental amalgam maintain that this documented scientific evidence is more than sufficient to warrant discontinuation of use of the material. They have called for a moratorium on further use of dental amalgam fillings until valid, in-depth studies are presented.

THE PRO-AMALGAM POSITION

The dental amalgam filling has been the backbone of dentistry for more than one hundred years, although its use in humans has been extremely controversial since the very beginning. Indeed, the American Dental Association, which is the foundation of contemporary dentistry, was founded by dentists favourable to the use of dental mercury amalgam as an alternative to the existant dental hierarchy, which considered use of the material not only potentially hazardous, but subject to charges of malpractice.

Initially, proponents of dental amalgam acknowledged the toxicity of mercury, but maintained that the mercury was firmly 'locked' into the filling, thereby rendering its toxic properties harmless. (27, 27a) Faced with an overwhelmingly proliferating body of scientific evidence to the contrary, amalgam proponents were obliged to alter their position. (22-24)

The new pro-amalgam position is to acknowledge the release of mercury from the set amalgam filling, but claim that the amount released is insufficient to cause pathologic damage to the patient. (22, 24, 27) This position presupposes possession of two distinct bodies of documented scientific information:
1. The amount of mercury accumulated in the body of any individual that will not cause pathologic damage.

2. The amount of mercury contributed by dental amalgam fillings to the body burden of subjects.

As previously clarified, the amount of mercury that is totally harmless in any single individual is unknown. (15-20) Indeed, in 1972 Friberg and Vostal stated that mercury may not have a toxic threshold; the toxicity of mercury probably follows a strictly linear dose-effect relationship. (21)

Insofar as the second requirement is concerned, in the entire history of use of dental amalgam there have never been any valid scientific studies presented that clearly determine the contribution of mercury from dental amalgam fillings to the body burden of patients. The very first scientific attempt to obtain this information was the research of Vimy and Lorscheider in 1985. (9b)

In view of the singular lack of valid scientific information on these two requirements, claims that the amount of mercury released from dental amalgam fillings is harmless to patients can only be considered totally devoid of scientific support. This position, therefore, might very well be subject to charges of 'negligent misrepresentation' and would be advisably scrupulously avoided.

Faced with a total lack of scientific support for their position, amalgam proponents have been forced to utilize measurements of urine mercury content to attempt to justify the safety of dental amalgam fillings. As previously defined, the mercury levels in urine or blood do not correlate to the body burden or toxic effects of mercury. (22-26) Even the American Dental Association and the National Institute of Dental Research have publically acknowledged this fact. (23, 24) This position is clearly irresponsible, if not negligent.

Some amalgam proponents claim that mercury amalgam fillings are harmless to patients because studies have shown that dental personnel are as healthy, if not healthier, than the general public. (1) Their claim is that, since dental personnel not only possess mercury fillings but work with mercury as well, one would expect a higher exhibition of mercury related health problems. Examination of these studies reveals no consideration of the dental filling status of the dental personnel. It is quite possible that dental personnel—being more conscious and motivated towards optimum prevention habits, besides being in a better position to opt for gold restorations—may possess significantly fewer mercury amalgam fillings. Moreover, these studies did not distinguish dental personnel who do work with mercury from those who do not—such as orthodontists, periodontists, oral surgeons, endontists, etc. A valid scientific study of only those dental personnel working with mercury, along with documentation of their personal dental amalgam status compared to the general public, could very well have yielded entirely different results. Moreover, these epidemiological studies did not separate the general public into those with and without metallic fillings.
Each of the four previously mentioned pro-amalgam documents will now be examined in relation to the valid scientific documentation.

**MERCURY IN DENTAL FILLINGS: IS THERE A PROBLEM?**

This widely disseminated article does not contain one single reference for the numerous dramatic and potentially influential statements made by the author. Considering the responsibility for the health impact on the readership borne by the author and the editor of the newsletter, it is hard to understand how the Harvard Medical School could have allowed these statements to be printed without supporting documentation or verification.

**STATEMENT:** "By using inappropriate methods to measure mercury, many advocates of removing amalgam fillings come up with incredibly high estimates." "Industrial machines are not designed to measure mercury vapor accurately under these conditions. Many substances present in the mouth can make the machine think it's seeing mercury when it isn't."

Dr. Baratz has not provided any supporting documentation for this sweeping indictment. There are a number of mercury vapor analyzers utilized for the detection of mercury vapor in samples of air, some of which are superior to others. The unit now most commonly used, both clinically and in research, is the Jerome 411 Gold Film Mercury Vapor Analyzer. This state-of-the-art unit has a built in eliminator of hydrogen sulfide, the only material that will give a false positive reading for mercury.(28) It is the unit utilized by industry and many government agencies. Moreover, a number of research studies demonstrating the release of mercury from dental amalgam fillings have utilized mercury measurement techniques other than portable mercury vapor analyzers.(7,8) These studies have demonstrated the release of mercury from dental amalgam at levels comparable to those studies utilizing the portable units.(9-11) Dr. Baratz appears to be saying that the researchers and government agencies are wrong and he is right, yet he offers no documentation to support this lofty opinion.

**STATEMENT:** "If you took these measurements at face value and did a few simple calculations, you'd quickly realize that they imply that ALL of the mercury would have to be evaporating from our fillings within a few months after they are put in place."

Dr. Baratz does not define his "simple calculations". The researchers do not contend that their readings persist 24 hours a day; they relate their findings to established TLV's for workroom exposures of healthy adults for a 40-hour work week, most commonly the NIOSH TLV of 0.05 milligrams Hg per cubic meter of air.(18) The average adult will inhale a maximum of 2.88 cubic meters of air per 8-hour work day (29) equalling 720 cubic meters per year (250 work days). The maximum yearly allowable exposure to mercury vapor according to the very liberal NIOSH standard would then be 36 milligrams of mercury (720 x 0.05). According to Craig's textbook on dental materials, the average amalgam contains 780 milligrams of mercury.(30) Therefore, contrary to Dr. Baratz's personal opinion, it would take 21.66 years
for only ONE amalgam to lose all of its mercury at the NIOSH toxic exposure level. Most patients have considerably more than one mercury amalgam filling.

STATEMENT: "But a filling falls apart when only 20% of its mercury is lost."

Measurements of the mercury content of amalgam fillings from extracted teeth have found fillings with mercury contents as low as 27%. (31,32) This represents a 46% reduction from the original content of approximately 50%. Dr. Baratz is claiming that amalgams will fall apart when their mercury content reaches 40% (20% loss of the original 50%). Unless Dr. Baratz can provide scientific documentation to support his 20% figure, his statements are without foundation and might even be considered a deliberate misrepresentation of existing research.

STATEMENT: "The rate of release is at least one thousand times, and probably a million times, slower than the estimates obtained from industrial air-sampling machines, and these rates are only sustained for a few minutes."

As previously discussed, research utilizing mercury vapor measurements with industrial units achieve results roughly comparable to those found in research studies utilizing other detection techniques. (7-11) Additionally, rates of release are sustained for 60 to 90 minutes after cessation of stimulation. (8,9b) Unless Dr. Baratz can provide scientific documentation to support his inflammatory, undocumented opinion, he has placed himself and the journal, in a vulnerable medicolegal position.

STATEMENT: "Inorganic or metallic mercury, the form used in amalgams, can be poisonous, but relatively large amounts are needed to produce symptoms."

Dr. Baratz has either deliberately misrepresented the facts, or is woefully uninformed regarding the toxicology of mercury and the firmly documented release of mercury VAPOR from amalgams. It is true that metallic mercury is the form initially placed into the amalgam filling and that, because of their low absorption rates into the body through the gastrointestinal tract, metallic and inorganic mercury are the least toxic forms of mercury. However, the research clearly demonstrates the release of mercury from the fillings in VAPOR and ION form. Mercury vapor, particularly, is far more toxic than the metallic and inorganic forms, due to its very rapid and complete absorption into the body by inhalation. (3,5) As previously discussed, the annual toxic dose of mercury vapor is 36 mg according to the very liberal NIOSH standard. The U.S. Environmental Protection Agency has established a standard for the general population of a maximum of 0.03 milligrams of mercury per day from all sources for a 70 kilogram (154 pound) adult (the only standard not limited to 40 hours per week of workroom exposure). (33) This totals 10.95 milligrams of mercury per year, less than 1% of the amount contained in a single average amalgam filling. Moreover, all of these standards, including the E.P.A. standard, are based only on the appearance of clinically observable signs and symptoms, not accounting for subclinical damage.
STATEMENT: "Studies of dentists themselves strongly suggest that mercury poisoning is not a major source of ill health in our country. Not only do dentists have all the same fillings the rest of us do, they have an occupational exposure to mercury, because they're handling it all the time in their work."

This is totally indefensible scientifically! These so-called "studies" did not distinguish dentists who work with mercury from those who do not, such as all of the specialists. Nor did they establish that dentists have "all the same fillings the rest of us do", a highly questionable opinion considering the dental prevention awareness of dentists, as well as their economic accessibility to gold and non-metallic dental materials.

STATEMENT: "Unless it's done under exceedingly careful conditions, taking out someone's fillings results in a much higher level of exposure to mercury than just leaving them in place."

This statement is nothing less than deliberate misrepresentation. There has never been a research study presented that compares the patient's mercury exposure from removal of amalgams to that received from the lifetime of the fillings left in place. Moreover, if Dr. Baratz is correct he has indicted virtually every dentist in the country who removes an old amalgam filling to replace it with a new one or a gold replacement.

SUMMARY: The statements and conclusions made by Dr. Baratz in this article are unreferenced, scientifically indefensible, and even contrary to existant scientific documentation. Continued distribution of this article is a disservice to the American public and the dental profession as a whole.

THE MERCURY SCARE

If a dentist wants to remove your fillings because they contain mercury, watch your wallet.

Consumer Reports. March 1986.

Although Consumer Reports is not a scientific journal, this article has received widespread distribution as documentation that mercury amalgam fillings are harmless. Near the beginning, the article presents two very valid statements:

1. "But in 1979, University of Iowa researchers found that chewing can release minute amounts of mercury vapor from old fillings." That research has since been augmented by a number of studies demonstrating the release of mercury vapor from all amalgam fillings (new and old) by not only chewing, but toothbrushing and hot fluids as well.(7-12)

2. "It's been known for centuries that mercury is a potent poison when swallowed, inhaled, or absorbed through the skin.

Further on, the author discusses measurement with the mercury vapor analyzer and makes two totally erroneous statements:
STATEMENT: "But for the patient, the exposure doesn't last for hours. It lasts only a few minutes during chewing-."

The 1985 research of Vimy and Lorschieder and of Patterson, et al. both demonstrated a post-stimulation 'cool down' period lasting at least 60-90 minutes following stimulation.(8,9) Without considering snacks, gum chewing, drinking coffee, or other habits the daily exposure would last a bare minimum of five hours, for individuals eating three meals a day and brushing their teeth twice daily.

STATEMENT: "...and only a fraction of the vapor may be inhaled."

The absorption rate of inhaled mercury vapor is extremely high. (5) Moreover, Vimy and Lorschieder (9) accounted for oral-nasal breathing ratios in their study and both Stock and Stortebecker (39) have demonstrated the absorption of mercury vapor through the nasal mucous membranes.

The author concludes that the mercury exposure from dental amalgam fillings is harmless because that exposure is not reflected by elevated levels of mercury in the urine of subjects. He quotes Dr. Thomas W. Clarkson of the University of Rochester School of Medicine:

STATEMENT: "Clarkson told CU that a person's mercury exposure can best be assessed by measuring the mercury levels in blood and urine. The urine level provides the best measure of 'body burden', or long-term exposure to mercury, while the blood level reflects recent exposure. If dental amalgams really were poisoning people, Clarkson pointed out, the mercury levels in the general population (where fillings are commonplace) would rival those found among workers exposed to mercury. That's far from the case."

It is unfortunate that Dr. Clarkson allowed himself to be quoted on the position reflected in this article. By doing so, he has placed himself in the position of obligation for defending the harmlessness of dental amalgam fillings based on his quoted and widely disseminated statements, a formidable task, indeed.

In the scientific community Dr. Clarkson stands virtually alone in his contention that the urine mercury level is a viable indicator of body burden of mercury. As early as 1964 Goldwater and associates stated that "those investigators who have studied the subject are in almost unanimous agreement that there is poor correlation between the urinary excretion of mercury and the occurrence of demonstrable evidence of poisoning."(25) Through the years, expert documentation has repeatedly reiterated that position.(22-26) Even the American Dental Association and the National Institute of Dental Research have publically stated that measurements of mercury in the urine and blood do not correlate to the toxic effects of mercury.(23,24) In 1980 Dr. Clarkson himself pointed out the existence of a very slow phase of mercury excretion, lasting over 100 days.(13) He pointed out, that with chronic exposure, this slow excretion phase (15% of each dose) would result in the accumulation of mercury within the body. As mercury exposure from dental amalgam fillings is a daily multiple exposure to very small doses, this exposure would not be reflected in
dramatic elevations of urine mercury levels.

Further, studies evaluating the urine mercury status of the general population have NEVER distinguished between subjects with and without mercury amalgam dental fillings. Even if urine mercury levels were a valid indicator, it is obvious and elementary that studies comparing the two groups would be necessary to evaluate the contribution of mercury from dental amalgam fillings.

Moreover, the time of day that a urine sample is taken has a bearing on the amount of mercury that will be present in the urine. This is called the diurnal variation. In a recent report, Calder et al. (1984) demonstrated that the urine mercury concentration was highest in the morning and lowest in the evening.(34)

Finally, "Clarkson expressed surprise that the CU reporter, who eats tuna at lunch most days, had such modest mercury levels in his blood and urine." This revealing experience of the reporter himself totally destroys the basic premise and credibility of the entire article, that urine mercury levels are a valid indicator of exposure to mercury. In effect, the reporter not only contradicted himself, but destroyed his own credibility.

The author concluded: "In CU's view, dentists who purport to treat health problems by ripping out fillings are putting their own economic interests ahead of their patient's welfare."

SUMMARY: The public would have been better served if the author and editor had taken a more responsible position and investigated the scientific data involved in the mercury amalgam issue rather than publish a totally biased and one sided article that resorted to smear tactics and character assassination, rather than scientific data, to support the pro-amalgam views of the author. Why the editor of Consumer Reports would permit such a slanted article to be printed on such an important public health issue presents some very interesting ethical and legal considerations.

The irresponsible statements by Consumer Reports and their unnamed "expert consultants" place in jeopardy all dentists who rely on this article and those dentists who routinely place amalgam fillings containing a known "potent poison" without obtaining an informed consent from each patient prior to placement.

SAFETY OF AMALGAM: TOXICITY AND ALLERGY
Amalgam Survives Systemic Toxicity Challenge


This recently published research study is certain to be widely utilized in the defense of dental mercury amalgam fillings as it presents actual research, rather than merely un referenced opinions. The study consists of three segments; mercury vapor studies, mercury solubility studies, and special immunological
studies on one individual.

I. MERCURY VAPOR STUDIES:

    Intra-oral mercury vapor measurements were taken with a Model MV-2 Bachrach Sniffer on 27 children, ages 11 to 13. Three of the 27 children had no amalgam fillings, thereby serving as controls. Mercury vapor was measured in the oral cavity before and five minutes after chewing sugarless gum and at two minute intervals thereafter (for an apparent total of 21 minutes). The findings were compared to The International Symposium on Maximum Allowable Concentration of Toxic Substances in Industrial Environment recommended standard of 0.05 milligrams of mercury per cubic meter of air. This standard is recommended as a time-weighted average for adults over a 40-hour work week, provided that the workers are continuously medically monitored.(17)

FINDINGS: Mercury vapor measurements on all three control children remained at zero. Of the 24 children with amalgams, 33% had levels exceeding 0.05 milligrams Hg/cubic meter. Of the 17 children with six or more amalgams, 47% had levels exceeding the MAC standard.

SUMMARY: "The data indicate a strong positive correlation of increasing Hg concentration with increasing number of restorations."

DISCUSSION: "Since chewing results in only a temporary rise in mercury vapor, such a concentration may not be any more dangerous than briefly walking through a contaminated work place. In theory, someone with more than six amalgam restorations who chews gum constantly could have a problem. "Studies of urine mercury levels indicate that amalgam restorations do not contribute significantly to the output."

It is painfully obvious that the authors of this study did not carefully read the report of the International MAC Committee, their own reference. The MAC Committee(17) specifically stated that their recommended standard was not an absolute value, but only an 'informed estimate'. They also specified that the standard should only apply to adult workers with only 40 hours of exposure per week, and that workers exposed to any mercury vapor at all should be routinely medically monitored for mercury poisoning. Moreover, since the 1968 MAC Symposium documented research has revealed subclinical damage from mercury vapor exposure.(18-21) The MAC Standard was based on studies investigating only clinically observable signs and symptoms of neurological damage.(17)

The authors' conclusion that "such a concentration may not be any more dangerous than briefly walking through a contaminated work place" is a quantum departure from their own findings, as well as a callous disregard for the health and well being of these 11 to 13 year old children. If the authors had been more conscientious in their search of the scientific literature they would have been aware of the research demonstrating the 60-90 minute 'cool-down' period following stimulation of the release of mercury from amalgam fillings.(8-9)
Considering only three meals a day and toothbrushing twice a day (without considering snacks or habits), these children would experience exposures lasting a bare minimum of five hours per day seven days a week: hardly a "brief walk through a contaminated work place". Furthermore, their reference to the studies of urine mercury levels is negated by the documented research and the public admission by the ADA and NIDR that urine mercury levels do not correlate to the toxic effects of mercury.(22-26)

More important is their finding of a statistical correlation between mercury vapor readings and number of amalgam fillings. Their research has further demonstrated the release of mercury vapor from amalgams upon stimulation and the increasing risk as the number of amalgams increases.

It is unfortunate that the research protocol utilized on the children did not establish the correct length of time for stimulation prior to taking intra-oral mercury vapor readings. Failure to determine this fact prior to initiating testing brings into question the validity of the whole study. Published research of other investigators has established that the release of mercury vapor from amalgam fillings does not peak and plateau until 10 minutes of chewing has elapsed. Even with the invalid stimulation time, 47% of the children with six or more amalgams had intra-oral mercury vapor readings that exceeded MAC standards.

Had they utilized the more sensitive and accurate Jerome Mercury Vapor Analyzer and bothered to read the research of Viny and Lorschieder(9) demonstrating that 10 minutes of stimulation (certainly not an uncommon function time) are required to reach peak vapor levels, their findings might even have been more dramatic. Perhaps then they may not have so casually dismissed the mercury vapor exposures received by these children.

II. SPECIAL IMMUNOLOGICAL STUDIES:

Patch tests, lymphocyte transformation studies, E-rosettes, immunoglobulins, and absolute lymphocyte and monocyte counts were performed on a 31 year old white female who experienced a severe allergic reaction. The subject's husband was also tested as a control. Results: Upon patch testing the subject showed positive for mercury, amalgam, her antibiotic capsules, dyes, and cosmetics. Her symptoms corrected without having the amalgams removed.

Immunological tests confirmed previous studies that mercury has a non-specific mitogenic effect on human lymphocytes; that is, the cells of the subject and her non-allergic husband were equally effected by mercury. "T and B cell populations were normal in our case, and were of no help."

Conclusions: "Patch tests are helpful to define allergy only, and to ascribe more to them is unscientific." "There is no established basis at this time for routine clinical use of these immunological parameters in the question of mercury toxicity or allergy."
Dorlands Medical Dictionary defines HYPERSENSITIVITY as an exaggerated immune system response (35). Immune system responses can be local or systemic, immediate or delayed (26,36). As patch testing considers only the local reaction, it is obvious that further considerations are necessary for evaluation of even ALLERGIC responses.

The "norm" for T and B cell populations and their ratios was developed without regard to whether the blood sample was taken from an individual who had metals (amalgam, nickel, chromium, beryllium) in their mouth. Consequently, no normal values have ever been established for individuals who have no metals in the oral environment. Moreover, published scientific research has shown that mercury can initially stimulate and then inhibit the proliferation of lymphocyte cells. (37) As the authors have so generously pointed out, mercury is a non-specific mitogen effecting lymphocytes from allergic and non-allergic individuals equally, hardly a comforting apology for mercury exposure.

III. MERCURY SOLUBILITY STUDIES:

The authors placed 2-3 millimeter masses of freshly mixed amalgam in test tubes of 1.5 milliliters of saliva and serum, a 2-3 mm mass of 4 hour old amalgam in saliva, and a 3.12 gram pellet of 4 hour old amalgam in serum. There was no mention made of the number of each sample tested. The samples were incubated at 37 degrees Centigrade for 48 hours, the tubes were filtered, and the weights of the amalgam and volume of the filtrate were recorded. Mercury concentrations of the filtrates were measured by cold vapor Atomic Absorption Spectrophotometer.

RESULTS: "Extremely small amounts of mercury were measurable by this technique in both freshly titurated (sic) and 4 hour old amalgam specimens".

CONCLUSION: "To be mitogenic, these values would have to be 308 times higher, and to be lethal to human lymphocytes, they would have to be 3080 times higher." "The risk of systemic mercury toxicity from amalgam based on these comparisons is so small as to be non-existent."

The authors' conclusions are in no way justified by the experimental design. The release of mercury from small samples of amalgam in minute amounts of saliva under passive conditions for 48 hours is obviously not comparable to what occurs in the oral cavity for the following reasons:

1. The authors did not compare the sample masses to the mass of amalgam found in patients.

2. The authors did not subject the samples to cyclic loading, which would simulate the effects of function experienced by amalgams in the mouth.

3. The authors did not consider the other intra-oral stimulants of mercury release from amalgams, such as toothbrushing, hot foods and fluids, clenching and grinding, acids, and electro galvanism.
4. The authors did not consider the scientifically established loss of mercury from samples in glass test tubes in 48 hours. (Ref) They made no attempt to fix the released mercury in the samples.

5. The authors did not consider the saturation concentrations in such small samples of saliva and serum.

In short, this experiment bears little, if any, resemblance to conditions to which amalgams are subjected in the mouth. The authors' conclusion that "the risk of systemic mercury toxicity from amalgam based on these comparisons is so small as to be nonexistent" is indefensible scientifically or medico- legally. Moreover, the conclusion failed to consider the effects of inhaled mercury vapor from the amalgams, which their own study confirmed. The authors themselves even stated that "any discussion of mercury must take into account the variability of the forms of mercury, and the absorption, distribution, and toxicity of each" and "mercury vapor is quite toxic-

The authors also state that "studies of urine mercury levels indicate that amalgam restorations do not contribute significantly to the output", listing only one "study" as their reference. As previously stated, even the ADA and NIDR have publically admitted that urine mercury levels do not correlate to the toxic effects of mercury.(22-26)

SUMMARY: One is obliged to wonder whether the Texas Dental Journal subjected this study to review by qualified researchers before allowing it in print.

DENTAL AMALGAM
FILLING DENTAL HEALTH CARE NEEDS

American Dental Association
Patient Pamphlet W186. 1985

The American Dental Association has presented this pamphlet to counter increasing concern over the safety of dental mercury amalgam fillings. As the statements in this pamphlet are not referenced and the pamphlet may influence the conduct of dentists and the health of innumerable patients, the scientific validity of these statements must be evaluated.

STATEMENT: "Is Dental Amalgam Safe? Scientific studies of dental amalgam in tooth restoration have been carefully conducted for more than 100 years. There is no scientifically sound evidence linking amalgam restorations to any general medical disorder. Quite the contrary, amalgam restorations continue to be shown safe for the vast majority of dental patients."

It is possible that this statement may some day be considered "negligent misrepresentation". The ADA has been unable to produce any scientific studies that even investigate the relationship between amalgam fillings and medical disorders. The voluminous research on dental amalgam has been almost exclusively limited to the physical
properties of the material. Three of the only four research studies among the eight references in the ADA's joint council statement on the safety of dental amalgam (1) are industrial studies relating toxicity to urine mercury measurements. Even the ADA, in 1984 (23-24), has formally admitted that urine mercury levels do not correlate to the toxic effects of mercury. The fourth study, by Frykholm in 1958, was also primarily based on urine mercury level measurements.

The ADA does also reference morbidity and mortality studies of dentists, but none of these studies distinguishes between dentists or population groups with and without amalgam fillings.

Moreover, a number of scientific studies have clearly demonstrated that mercury and/or dental amalgam can cause pathological damage to periodontal tissues (40-45). Even dental and medical textbooks so state (2,3).

In addition, Verschaeve and associates demonstrated that subjects with dental amalgam fillings have increased numbers of chromosomal aberrations in circulating lymphocytes (46). The preliminary study by Eggleston suggests further harmful effects of amalgams on human immune systems (47).

STATEMENT: "Is The Mercury Component Of Amalgam Also Safe? Yes. After more than a century of thorough testing, no scientifically reliable study has found the mercury component of amalgam to present a threat to the general health of dental patients. This is because mercury is made virtually harmless when it combines with the other metals used to produce amalgam."

Even the ADA has publicly admitted that chewing causes the release of mercury from set amalgam fillings (23,24). Current research has now demonstrated that toothbrushing and hot fluids also stimulate the release of mercury from the set amalgams (8,10). The ADA cannot produce research studies establishing the amount of mercury contributed to the patients throughout the lifetime of the amalgams. Nor can they produce valid scientific studies investigating the medical status of subjects with and without amalgam fillings.

STATEMENT: "Eventually, the body rids itself of mercury through the urine, but there is always a very low level of mercury present in the human system."

The ADA offers no explanation for this obviously contradictory statement. In 1980, Clarkson pointed out the existence of a very slow component of mercury elimination, lasting over 100 days (13). Clarkson stated that, with chronic exposures, this slow component (15% of each dose) would result in the slow accumulation of mercury in the subject's body. In 1978 Sugita determined that the biological half-time of mercury exposure in humans would be 18 to 20 years in the cerebrum. Sugita also presented evidence demonstrating that the slowest component of mercury elimination has a biological half-time that is short when the dose is large, but long when the dose is small (14).
STATEMENT: "Various brands of dental amalgam are available. More than 50 years ago, the American Dental Association established a certification program to help dentists choose from among THE SAFEST and most effective of these brands."

This statement is a patent misrepresentation. The ADA specification no.1 for alloy for dental amalgam has no requirement for biocompatibility testing of amalgam products, only for the product's physical properties. Interestingly, the ADA specification no.27 for composite filling materials DOES require testing for biocompatibility. In response to a query concerning their certification of amalgam, the ADA responded in writing "We cannot certify a reaction product made by the dentist."

STATEMENT: "In extremely rare cases, some individuals are allergic to amalgam. However, an allergic reaction to amalgam is so uncommon that it involves less than 1% of the general population."

The ADA cannot produce any research studies confirming this widely quoted figure of "less than 1% of the general population". As a matter of fact, the ADA/NIDR Workshop on the Biocompatibility of Metals in Dentistry held in Chicago in 1984 recommended the need for future research in certain areas. Three of these recommendations pertained to conducting studies to determine the prevalence of mercury allergy in the general population, which is a further indictment of the less than 1% being used by the ADA.(22,24)

Bear in mind that 1% of the general population of this country involves well over 2 million people, which in itself is enough to warrant a total ban on further use of amalgam. However, based on existing published scientific research, the problem would appear to be of much greater magnitude: In 1969 Djerassi and Berova found 16.1% of all patients tested were allergic to amalgam (interestingly, only 11% of the same group were allergic to mercury)(48); A 1973 study by the North American Contact Dermatitis Group (testing 1200 patients) demonstrated that 8% had a positive reaction to merthiolate (contains mercury) and 5% reacted positively to a 1% solution of ammoniated mercury(49); A 1975 study by Brun involving patients with contact dermatitis found 11.3% tested positive to the mercury patch test(50); Nebenfuher et al. (1983) tested 1530 in-patients and found 9.6% allergic to mercury(51); and in 1985 at the Baylor College of Dentistry, Dallas, Texas, Miller et al. found a significant correlation between the number of amalgams and the incidence of mercury hypersensitivity. (52) Based on this information, the total numbers of the general population of this country who may be susceptible to some type of allergic reaction to amalgam fillings could range from 5 million to 32 million people.

STATEMENT: "Your dentist can safely and easily mix amalgam in his or her office."

The ADA has issued rigid recommendations for the handling of mercury and amalgam in the dental office. These recommendations include storage of scrap amalgam under fixer solution in tightly sealed containers, avoidance of spills, and cautions not to touch the
mercury or amalgam with hands. The ADA apparently feels that there is
only one safe place to store dental amalgam; that is in human teeth!

STATEMENT: "One-hundred and fifty years of experience with dental
amalgam have proved it to be a safe and essential means of filling
patients' dental health care needs."

In the total absence of valid scientific data supporting the
safety of dental amalgam, this statement is the only remaining defense
of amalgam. Not only is this position ANECDOotal and UNScientific, but
in view of the known toxicity of mercury, it is INHUMANE!

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* Extra copies of this Special Issue have been printed and will be *
* available for those who desire to provide them to their colleagues,*
* patients, media, or put them in your reception room. Prices *
* including postage are: single copies $2.00; 2-10 copies $1.75 each;*
* 11-25 copies $1.50 each and 26 or more copies $1.25 each. *
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FORUM

The annual meeting of the International Academy of Oral Medicine and Toxicology will be held in New York City on November 28, 29 30, 1986. Program Chairman is Dr. Joel Berger, 718-225-2121. Dr. Mats Hanson of Sweden will be one of the distinguished presentors. The meeting will be held at the Sheraton Centre Hotel, 811 7th Ave at 52nd Street, New York, NY 10019. Room rates are:$130.00 Single and $155.00 Double. Toll free phone # is: 1-800-223-6550. Reservations must be confirmed prior to Nov 7, 1986. Unless you are going to use your credit card, a check for the 1st days charge should accompany your reservation request.

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Frontiers of Dental Medicine, Dental Application of Bioelectronics Boston University, Wed October 8, 1986. Dr. Victor Penzer and Dr. Helmut W. Schimmel. The most advanced concepts and diagnostic techniques from Western Europe will be presented. The most advanced of the bioelectronic
techniques developed in West Germany will be demonstrated and the principles discussed. The Dental Diagnostic Kit will be introduced.

Dr. Schimmel will also be presenting a 3-day Vega seminar, Oct 10-12, 1986. For more information contact Dr. Penzer 617-332-1234.

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Silver Dental Fillings - The Toxic Time Bomb by Sam Ziff
Aurora Press will be releasing a revised and expanded edition of the book in October 1986.

65 pages of new or additional scientific information on the mercury amalgam issue, available since original publication, has been added. For easy access the updated material is included in four new chapters (10-14) that have been added to the end of the original edition. Included in the new material are rebuttals (fully referenced and documented) to the Consumer Reports and Harvard Medical School Health Letter articles.

Aurora Press has also designed a new cover, which gives the book a whole new look. The price of the new expanded edition is $10.95 and Bio-Probe is now accepting advanced orders. Volume discounts will be available.

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