MOTHERS AND BABIES EXPOSED TO DENTAL AMALGAM MERCURY!!!

Maternal-fetal distribution of mercury (\(^{203}\) Hg) released from dental amalgam fillings.

Vimy, MJ; Takahashi, Y; Lorscheider, FL. [Departments of Medicine and Medical Physiology, Faculty of Medicine, University of Calgary, Alberta, Canada.] Am J Physiol. 258:R939-R945. April 1990.

AUTHORS’ ABSTRACT: In humans, the continuous release of Hg vapor from dental amalgam tooth restorations is markedly increased for prolonged periods after chewing. The present study establishes a time-course distribution for amalgam Hg in body tissues of adult and fetal sheep. Under general anesthesia, five pregnant ewes had twelve occlusal amalgam fillings containing radioactive \(^{203}\) Hg placed in teeth at 112 days gestation. Blood, amniotic fluid, feces, and urine specimens were collected at 1- to 3-day intervals for 16 days. From days 16-140 after amalgam placement (16-41 days for fetal lambs), tissue specimens were analyzed for radioactivity, and total Hg concentrations were calculated. Results demonstrate that Hg from dental amalgam will appear in maternal and fetal blood and amniotic fluid within 2 days after placement of amalgam tooth restorations. Excretion of some of this mercury will also commence within 2 days. All tissues examined displayed Hg accumulation. Highest concentrations of Hg from amalgam in the adult occurred in kidney and liver, whereas in the fetus the highest amalgam Hg concentrations appeared in liver and pituitary gland. The placenta progressively concentrated Hg as gestation advanced to term, and milk concentration of amalgam Hg postpartum provides a potential source of Hg exposure to the newborn. It is concluded that accumulation of amalgam Hg progresses in maternal and fetal tissues to a steady state with advancing gestation and is maintained. Dental amalgam usage as a tooth restorative material in pregnant women and children should be reconsidered.

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**EXPERIMENTAL PROTOCOL:** The sheep was selected as the experimental model because it exhibits molar chewing mechanics and is the animal of choice for obstetrical research. Although similar to humans in body weight (approx. 150 lbs.), the amalgam fillings were one half the size (approx. 425 mg Hg.) of the average amalgam in human adults. The amalgam fillings were overcarved in a concave form to prevent excessive amalgam wear in the ruminating animals. The use of radioactively labelled mercury provided specificity; mercury found in the animals could not be confused with mercury from any other source. Intra-oral mercury vapor readings performed during the course of the experiment precisely matched values found in humans in previously published research.
FINDINGS: Mercury from the dental amalgam fillings appeared in maternal and fetal blood and amniotic fluid within two days after placement of the amalgam fillings in mothers. Mercury levels in blood remained fairly constant after 2 days. At 16 days after amalgam placement mean concentrations in maternal blood were ~4 ng/gm (range 3-7) and amniotic fluid (range 2-8) and FOUR TIMES HIGHER in fetal blood (mean ~16 ng/gm, Range 7-23). Mercury levels in maternal urine reached a plateau mean of 5 ng/gm (range 1-12) at 4 days.

In mothers, mercury accumulation was highest in kidney (~9000 ng/gm) and liver (~1000 ng/gm). Other prime target levels were heart and muscle (~10 ng/gm) and fat (1-5 ng/gm). Brain cerebrum, occipital lobe, and thalamus showed mercury accumulation as early as 16 days, and from 29-140 days Hg levels ranged from 3-13 ng/gm. Mothers’ milk obtained within 2 days after birth contained levels of Hg from dental amalgam reaching as high as 60 ng/gm, a level much higher than levels found in maternal blood.

In fetuses, mercury accumulation levels were highest in liver (100-130 ng/gm) and pituitary (100 ng/gm). Mercury levels in cerebrum, occipital cortex, and thalamus were ~10 ng/gm. Other high tissue levels were found in kidney (10-14 ng/gm) and lung, heart, muscle, thyroid, and adrenal (<10 ng/gm).

CONCLUSIONS: "We conclude that Hg released from dental amalgam tooth fillings will begin to selectively accumulate in maternal and fetal tissues soon after amalgam placement. Accumulation of amalgam Hg progresses in tissues to a steady state with advancing gestation and is maintained for as long as 20 wk. Amalgam restorations are a source of continuous Hg exposure to both mother and fetus. In view of the experimental evidence presented herein, continued employment of dental amalgam as a tooth restorative material in pregnant women and children should be reconsidered."

BIO-PROBE COMMENT: What is the significance of this research and how does it relate to the use of dental amalgam in humans? Previously, it has been clearly demonstrated that mercury from dental amalgam fillings is continuously released, enters the patient’s body, and builds up with time. This latest study demonstrates a rapid transfer of dental amalgam mercury from the fillings into the tissues of pregnant females and their babies. It further demonstrates an even greater exposure to mercury if the newborns are nursed.

Animal research is the foundation of medical therapy for humans. Competent, responsible medical scientists do not ignore results obtained from controlled animal experimentation published in highly respected medical scientific journals. Of special note is the selection of the animal model for this study. The object of investigation is the release of mercury from dental amalgam fillings under conditions of natural use and function. Animals commonly used for research - rats, mice, guinea pigs, hamsters, dogs - do not function with molar chewing mechanics as in humans; sheep do. Moreover, the sheep is the animal of choice for obstetrical research.

Clearly, in view of the highly toxic nature of mercury, particularly in the early developmental stages of life, this research presents compelling evidence calling for a reevaluation of the use of dental amalgam fillings in children and in women of child-bearing age.

MEDICAL FRAUD? - WHO IS REALLY GUILTY?

The following quote appeared in the ‘Letters’ section (page 17) of the March 1990 issue of Dental Economics: "Which leads me to a most important point: Dr. G____ says that quackery and fraud should be weeded out in the courts. I am not willing to let the quality and appropriateness of my treatments be decided by scientifically illiterate judges and juries. This should be decided by the courts of science, not law! And Dr. G____ should know that, in real science, you indeed are guilty until you prove yourself innocent. A treatment should not be used until proof is provided that it is safe and effective; to do otherwise is to perform quackery." The letter is signed by Marvin J. Schissel, D.D.S. Woodhaven, NY. (1) Let’s examine an application of this logic.
is to perform quackery." The letter is signed by Marvin J. Schissel, D.D.S. Woodhaven, NY. (1) Let’s examine an application of this logic.

Advocates of mercury amalgam dental fillings base their position on the anecdotal belief that over 150 years of use is proof that the mercury released from amalgam fillings causes no health damage to patients. A recent "Special Report" in the Journal of the American Dental Association stated: "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." (2) Defenders of amalgam further point out that although patient exposure to mercury from dental amalgam fillings has been clearly established, it has not been proven to cause any specific disease or syndrome and, moreover, the responsibility to do so rests with the opponents of dental amalgam use, not its advocates.

The above position of dental amalgam advocates is contrary to the beliefs of Dr. Schissel, who clearly states that in real science you indeed are guilty until you prove yourself innocent and "quackery" is performed by those using a treatment that has not been proven to be safe.

So who is this Marvin J. Schissel, D.D.S. of Woodhaven, NY? He is none other than the co-director, along with John E. Dodes, D.D.S., of the New York Chapter of the National Council Against Health Fraud (NCAHF).

Now it gets puzzling! The NCAHF has openly declared that opposition to the use of dental amalgam because of patient exposure to mercury is "dental fraud". In an article published in the Journal of the American Dental Association (Vol. 115:679-685. November 1987.) entitled "Questionable Care: What Can Be Done About Dental Quackery?", various leaders of the NCAHF are identified as "experts" and extensively quoted. (3) The author of the article is identified as James H. Berry, editor of the ADA News, in cooperation with the ADA Division of Scientific Affairs and other Association agencies. Quoted in agreement with the NCAHF "experts" is ADA Director of Scientific Affairs Enid Neidle, Ph.D.

In the section entitled "Experts list likely areas of dental fraud" (page 685) mercury toxicity from dental amalgam is identified. It is stated that "the ADA Council on Ethics, Bylaws, and Judicial Affairs said in a recent advisory opinion that removing serviceable dental amalgam from nonallergic patients because it is allegedly a toxic substance is ‘improper and unethical’. " The section concludes with the following: "For additional information on quackery contact: The National Council Against Health Fraud, Inc., PO Box 1276, Loma Linda, CA 92354."

The NCAHF "experts" identified in the article include three dentists (Daniel B. Oliver, John E. Dodes, and Charles Greene), along with Stephen Barrett, M.D., and William T. Jarvis, Ph. D. (president of the NCAHF).

No information is provided to qualify these individuals as "experts" on mercury, dental amalgam, or mercury toxicity from dental amalgam fillings. An exhaustive search of the scientific literature fails to reveal any basic research published by any of these individuals on any subject related to mercury exposure from dental amalgam fillings. To be sure, one need not have conducted basic research to be considered well informed, or even expert, on a subject. However, if one stands in judgement of an issue and presumes to be considered an "expert" on that issue, a scientifically documented foundation must be provided. Even Dr. Marvin J. Schissel (of the NCAHF) agrees that to do otherwise is considered quackery. No scientific evidence is provided by these "experts"!

Where does the NCAHF derive its authority as policemen of the dental profession? Were they selected by a government agency, a scientific body, or are they merely self-appointed? Self-styled "experts", unsupported by scientific evidence, do not have the right or authority to influence the public health by labelling treatment they do not provide as "fraud" or "quackery" simply on whim. Policing of the dental profession is accomplished by the provision of sound scientific research, with findings that can be replicated, in respected, reviewed scientific journals and texts.
We shall now see the danger of the public position of the NCAHF on the safety of dental amalgam. Valid, peer-reviewed scientific documentation has clearly demonstrated a number of facts on the issue. These facts are directly contrary to the NCAHF position that those who question the safety of dental amalgam fillings are guilty of fraud and quackery. The NCAHF has placed itself in the extremely uncomfortable position of being in opposition to the scientific community and as a result must now, itself, face the possibility of being considered frauds and quacks - a prospect that could very well destroy its own credibility.

The possibility that dental amalgam fillings could present a health risk to patients must be satisfied by four criteria: 1. Do dental amalgam fillings contain a toxic material? 2. Does the toxic material exit the filling? 3. Does the released toxic material enter the body? 4. Does the toxic material reach harmful levels within the body? All four of these criteria have been well satisfied for dental amalgam. In the interest of space in this article, only a few of the pertinent studies will be presented. Many more exist, most of which have already been reviewed in previous issues of the Bio-Probe Newsletter.

DO DENTAL AMALGAM FILLINGS CONTAIN A TOXIC MATERIAL?

Actually, all of the elements comprising dental amalgam are toxic metals. Mercury is far and away the most toxic of them. Few people realize the severity of mercury as a toxin. Sharma and Obersteiner established that mercury is more toxic than lead, cadmium, or even arsenic. (4)

Confusion does exist on the comparative toxicity of the different forms of mercury. Methylmercury and mercury vapor are considered the two most toxic forms. (5) These two forms of mercury are not the most toxic because they cause damage differently within the human body; they are the most toxic because they are capable of entering the human body very rapidly and completely. In other words, their 'absorption rate' is much higher than other forms of mercury in the metallic form, which is very poorly absorbed.

Mercury vapor is fat soluble and neutral electrically. It therefore has the ability to easily penetrate cell membranes and pass rapidly into the body and from the blood into body cells. This is why exposure to mercury vapor will not result in greatly increased levels of mercury in the blood or urine. (6)

Methylmercury is considered to be the most dangerous form of mercury. This is true if the methylmercury is derived from grain. The prestigious National Academy of Sciences pointed out that fish containing methylmercury also contain even higher levels of selenium which serves to alleviate some of the potential toxicity of methylmercury derived from fish. (7) In addition, it has been scientifically established that patient intake of mercury vapor from dental amalgam fillings is comparable to intake of methyl mercury from fish. (8,9)

DOES MERCURY EXIT THE DENTAL AMALGAM FILLING?

This is no longer an issue. The previous position of amalgam advocates that mercury is 'locked' into the amalgam has been clearly proven to be erroneous. Even the National Institute of Dental Research and the American Dental Association have publicly acknowledged that mercury is released from dental amalgam after stimulation, such as chewing and brushing. (10)

Actually, dental literature and even dental textbooks have acknowledged this as far back as 1880! (11,12) Dental amalgams become miniature batteries when placed in the electrolytes (saliva, plaque, etc.) in the oral cavity. Electrical currents are produced by the movement of metal ions, so it is actually physically impossible for the metals to be locked in place when a battery is created.

DOES THE MERCURY RELEASED FROM DENTAL AMALGAM ENTER THE PATIENT'S BODY?

This is also no longer an issue. Space does not permit review of all the pertinent studies. This was adequately done in the toxicology reference "The Biological Monitoring of Toxic Metals" by T.W. Clarkson, L. Friberg et al. (8) Drs. Friberg and Clarkson are acknowledged to be the world's foremost experts on mercury toxicology.
An entire chapter in this reference is devoted to patient exposure to mercury from dental amalgam fillings, which were found to be the largest contributor of inorganic mercury, including mercury vapor, to humans. The published human autopsy studies were discussed, all of which showed a statistical correlation between the number of amalgam fillings present and the amount of mercury found in the brain tissue of subjects.

Further evidence is found in more recently published research. (13,14) A research team at the University of Calgary School of Medicine, utilizing amalgam fillings containing a portion of radioactively labelled mercury, has now traced a rapid transfer of mercury from the fillings into the tissues of animals, including the fetuses of pregnant mothers. The researchers are finding that the amalgam-derived mercury continues to build up in the bodies of the animals with time.

It is interesting to note the response of the NCAHF to this classic research. A strident letter was written to the editor of The FASEB Journal by John E. Dodes, D.D.S., Director, New York Chapter, National Council Against Health Fraud, Woodhaven, NY. The letter and the response from the Calgary researchers were published in the March 1990 issue of The FASEB Journal. (15) [A copy of these two letters has been included with this issue of BPNL with the permission of FASEB.] The Calgary response was by F.L. Lorscheider, Ph.D., Professor of Medical Physiology, Faculty of Medicine, University of Calgary.

Dr. Dodes, in addressing the first study by the Calgary team published in The FASEB Journal in December of 1989, declares that the research is totally worthless and without foundation. It is amusing that a practicing dentist, albeit a Director of a Chapter of the National Committee Against Health Fraud, could consider himself so "expert" on scientific research as to label scientific researchers as "frauds" (doing so by presenting his letter to The FASEB Journal under the title of NCAHF Chapter Director, rather than on personal stationery).

It now becomes a matter of credibility! First, the research team at the University of Calgary contains only one dentist, with the others being M.D. and Ph.D. research scientists. These scientists and the University of Calgary medical research department have outstanding credentials and reputations. Dr. Dodes on the other hand, in spite of his position with the NCAHF, has no established scientific credibility. Secondly, one must consider The FASEB Journal (13), which is an impeccable scientific publication representing more than 30,000 scientists in the various disciplines of experimental biology (Federation of Societies for Experimental Biology). The review standards of The FASEB Journal are so stringent and critical that only a handful of the numerous available studies are published each year. The American Journal of Physiology (14) is the premier scientific journal of the American Physiological Society and also has a very large international subscription. In effect, Dr. Dodes has placed himself and the NCAHF in direct opposition to the cream of the medical scientific community, not an enviable position to say the least.

**DOES THE MERCURY FROM DENTAL AMALGAM FILLINGS REACH HARMFUL LEVELS WITHIN THE PATIENT'S BODY?**

This is the only remaining issue to be settled. The key here is the form of mercury in question - mercury vapor! Although many poisons have a "toxic threshold" (the level of exposure above which causes harm but below which does not), the toxicology authorities say mercury vapor does not! In the U.S. Environmental Protection Agency's "Mercury Health Effects Update"(9) it is stated that for mercury vapor "no threshold for these and other effects has been clearly established" (page 2-7) and "the dose-response relationship depicted in Figure 6-5 does not exhibit any clear threshold" (page 6-12).

In presenting its guidelines for worker exposure (40 hours per week) to mercury vapor, the U.S. National Institute of Occupational Safety and Health (NIOSH) states: "It is difficult, if not impossible, to establish a level at which no effects are observed."(16)

Dr. Lars Friberg, acknowledged to be the world's foremost authority on inorganic mercury, states "dose-response relationships are not known for most exposure situations", "it is not possible to state a lowest concentration which may give rise to some medical manifestation" and "it is not possible to make
The fact that no amount of exposure to mercury vapor can be considered totally harmless to the general population has been printed in the Journal of the American Dental Association (18) and the Journal of the Canadian Dental Association (19).

The stated opinions of toxicology authorities notwithstanding, amalgam advocates persist in claiming that patient exposure to mercury from dental amalgam is not harmful. Without exception, these opinions are based on measurements of mercury in the blood and/or urine, even though the National Institute of Dental Research and the American Dental Association have publicly acknowledged that these measurements do not correlate to the body burden or toxic effects of mercury. (10)

Scientific research has clearly established that mercury vapor passes very rapidly from blood to tissue and that levels of mercury in blood or urine are not reflective of the mercury in the body. (6,10,16) The recent research by the Calgary team confirms this as they found blood mercury levels from dental amalgam to be much lower than amounts of mercury found in tissues, even after short exposure time. (13)

Another argument frequently used to defend the use of dental amalgam is that if the mercury were indeed a problem, then dental personnel would be showing its effects more so than patients. Claims are made that dentists are as healthy as the general population. There are several serious flaws to that argument. First of all, no wide spread studies have ever been conducted that compare the health of dentists with and without amalgam fillings in their own teeth to the general population with and without amalgam fillings. (18) Chances are, considering educational and economic factors, dentists as a group may possess fewer amalgam fillings than surveyed groups of the general population. Nor do any existing studies compare the health status of dentists who use mercury to those that do not.

Another fallacy is the comparison of the inhalation and absorption of mercury vapor from sources within the body (the mouth) and from outside the body (the floor of the dental treatment room). Occupational scientists refer to this as the "breathing zone" or "microenvironment". Obviously, if the source of mercury is distant then it will be dispersed in a large volume of air and less will be inhaled and absorbed. Dental amalgam fillings are implanted directly in the intimate breathing zone of subjects.

The final error in this reasoning is the reference to dentists, rather than dental assistants. In most dental offices dentists do not mix the amalgam; it is the dental assistants who handle it. Actually, a number of studies have been done on certain aspects of health of female dental personnel, the results of which are not very comforting at all. (9)

**THE ISSUE WILL FINALLY BE SETTLED - SOON!**

The investigation of the specific health effects of patient exposure to mercury from dental amalgam fillings is now in progress. Several studies are scheduled for publication in the near future. The controversy over the safety of dental amalgam is no longer in the hands of the dental profession alone. It is now being investigated by scientists from various health fields.

In the meantime, one country is already taking steps to deal finally with the amalgam controversy. In Sweden, an expert commission of physicians and toxicologists was appointed to investigate the controversy. After 18 months of literature review the expert commission declared that amalgam was toxicologically unsuitable as a dental filling material. It further recommended that the use of dental amalgam be initially stopped in children and pregnant women. Finally, Sweden’s Chemical Inspection Agency has declared that it will ban the use of dental amalgam totally; the timetable is now being prepared.

This is all further evidence that the NCAHF "experts" have aligned themselves against the recognized and respected scientific community. It is indeed unfortunate for the dental profession that its foremost organization, the American Dental Association, has chosen to align itself with the National Council Against Health Fraud. (2,3) The ADA may find that this alliance is fraught with danger and suffer a severe loss of credibility, as it appears likely that the NCAHF will be found culpable of fraud and quackery for its position on the safety of dental amalgam. As so aptly stated by Marvin J. Schissel, D.D.S. "in real science, you are
indeed guilty until you prove yourself innocent. A treatment should not be used until proof is provided that it is safe and effective; to do otherwise is to perform quackery".

REFERENCES


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FORUM

The next IAOMT Board meeting will take place in Montreal, Canada on Saturday and Sunday, May 19 & 20, 1990. Dr. Murray J. Vimy will be making a presentation regarding some of the just completed and some of the ongoing mercury/amalgam research projects at the University of Calgary Medical School. Rooms are available at the Queen Elizabeth Hotel. Room reservations may be made by calling 1-800-241-8260 from the United States; calling from Ontario use 800-268-9420 and for the balance of Canada use 800-268-9411. For further information on the meeting please contact Dr. Barry Faguy at 514-697-9006.

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The Annual Scientific Meeting of the International Academy of Oral Medicine and Toxicology will be held September 14-15, 1990 at the Terrace Garden Inn, 3405 Lenox Road N.W., Atlanta, GA 30326. Rates are $80.00 single and $90.00 double. For room reservations call 1-800-241-8260, or 404-261-9250. For information on the meeting contact Dr. Ronald M. Dresslet at 404-349-2088. There will be an exciting slate of National and International speakers.

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For those of you who are curious about what took place at the International Symposium on the Hazards of Dental Amalgam held March 30, 1990 in Raleigh, North Carolina there is good news. The entire day was professionally video taped by Michael Brown of Productions West. There are a set of four tapes that are being sold at $55.00 each or the complete set of 4 tapes for $180.00:


Tape #3 Sandra Denton, M.D. Infertility and Birth Defects; Alzheimer’s Disease. Hal Huggins, D.D.S. Immunologic effects; Biocompatibility; University of Colorado’s research on auto-immune deficiencies.

Tape #4 Basil Roebuck, M.D. His concern about the use of amalgam. Mats Hanson, Ph.D. Absorption in human brain tissue; Sweden’s current position on continued use of amalgam. Robert Reeves, Esq. Medical and Legal issues related to the continued use of dental amalgam.

This is a joint project of the North Carolina DAMS chapter. To order indicate which tapes you want, make your check payable to Pat Preyer and send your order to Pat Preyer, P.O. Box 11561, Winston-Salem, NC 27116. If you need to talk to Pat you can contact her after 6:30 P.M. at (919) 924-0513.

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The American Academy of Biological Dentistry is presenting a seminar on "Neural Therapy: A method of diagnosis and regulation therapy. A key to the understanding of man’s illnesses", to be held at Carmel Mission Inn, Carmel, California on June 22-25, 1990. The Instructor/speaker will be Franz Hopfer, M.D., D.D.S. For more information contact Dr. Ed Arana at 408-659-5385 or write the Academy at P.O. Box 856, Carmel Valley, CA 93924.

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