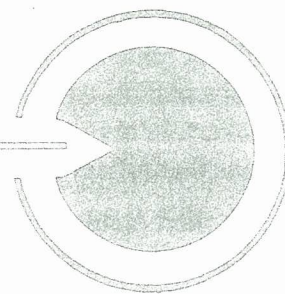


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MERCURY INTAKE FROM DENTAL AMALGAM FILLINGS

By

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How ludicrous the dental profession of the United States must appear to the public and to the toxicology experts of the world!

While our dental educators devote their energies to arguing mathematical equations, world experts and governments are concluding that any exposure to mercury from dental amalgam fillings is undesirable for the public.

The imbroglia seems to have started with the research of Vimy and Lorscheider, attempting to quantify the contribution of mercury vapor to the accumulation of mercury in the bodies of subjects. In their first two studies (8,9), Vimy and Lorscheider measured intra-oral mercury vapor levels before and after stimulation and estimated daily mercury vapor intake in subjects with various numbers of amalgam fillings. In their third published study (10), Vimy and associates attempted to predict the accumulation of mercury in the body and its compartments over periods of time at the exposure levels found in their previous studies. Previous published research had merely established, albeit firmly and conclusively, that patients were being exposed to mercury from dental amalgam fillings without attempting to quantify that exposure in terms of intake and accumulation.

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Did the pro-amalgam forces prove that Vimy and associates, as well as the numerous other researchers, were wrong by presenting documented research demonstrating that patients are NOT being exposed to mercury from their amalgam fillings. No, of course not! Why not? Because there is no research establishing that position, nor is it possible to have any! Patients ARE being exposed to mercury from their amalgam fillings and that daily exposure results in the accumulation of mercury in their bodies with time. These scientific realities have been confirmed by three separate published autopsy studies and are therefore inescapable and unarguable!

Instead of disproving the scientific reality of the findings of Vimy and associates, the pro-amalgam forces have attempted to belittle their conclusions by challenging their mathematical agility.

The anticipated culmination of this counter-attack was the opinion paper entitled "Factors Affecting Estimation of Dental Amalgam Mercury Exposure from Measurements of Mercury Vapor Levels in Intra-oral and Expired Air" by J. R. Mackert, Jr (1987). We call this an 'opinion paper' deliberately because Dr. Mackert, in his vain attempt to discredit Vimy and associates, has himself committed several glaring omissions that reflect his lack of objectivity and knowledge of the subject.

Dr. Mackert challenges the calculations of Vimy et al., claims that they overestimate the daily dose of mercury from amalgam fillings by a factor of at least 16, and concludes "the contribution of dental amalgam to total daily intake of mercury is seen to be minor".

The rationale presented by Dr. Mackert encompasses such profound physiological health parameters as sampling time, size of the sampling tube, air departure paths, flow rates, mouth geometry and the length of time the air spends in approximation to the amalgam fillings; all of which leads to his uniquely accurate determination of 'mercury vaporization rate' from the amalgams from which he calculates the daily intake. Although Dr. Mackert is obviously impressed with his own knowledge of physics, this pride has prevented him from noting the blatantly obvious fallacy in his own calculations, which were pointedly derived from the data of Vimy and associates (Table 2 and Discussion, page 1778, reference #4) and specifically intended to discredit those authors. Had Dr. Mackert been forthright and thorough, he would have reiterated the intention of Vimy et al. to simply estimate the mercury vapor intake from three meals and three snacks per day without consideration of the influence of various habits (such as gum chewing), body size and weight, and **THE CONTINUOUS INHALATION OF MERCURY VAPOR 24 HOURS A DAY!**

Data from a number of published research studies has clearly demonstrated that mercury vapor is released from amalgams constantly and that the release is simply increased by stimulation, and that it takes at least 90 minutes to return to the pre-stimulated baseline release levels. Although the pre-stimulated levels of mercury vapor in the oral cavity may be low, the average number of inhalations per day is 17,280 (12 breaths per minute x 60 minutes x 24 hours). Considering a 24 hour oral/nasal breathing ratio of only 35%, if only 1 nanogram per breath were inhaled and 80% of that is absorbed in the lungs alone, the intake would be 4.84 micrograms per day, without even considering any meals, snacks or habits. The USEPA standard for adults limits the daily intake of mercury from all sources other than diet to 20 micrograms per day.(7) Is 1 nanogram per inhalation an unreasonable assumption? Since the volume of the average oral cavity is roughly 50 ml (cc), the concentration of mercury would be only 0.02 micrograms Hg/cubic meter. According to data from published studies, unstimulated baseline mercury vapor measurements in subjects with amalgams far exceed that level.

Dr. Mackert, then, has pointedly ignored the obvious - that patients are exposed to mercury from dental amalgam fillings 24 hours a day. One must wonder whether his intention was to scientifically evaluate that exposure, or merely to attempt to discredit the work of Vimy and associates.

A forthright and scientific evaluation of patient exposure to mercury from dental amalgam fillings would have to encompass three factors with scientific data available and three factors which would have to be estimated. The three factors with available scientific data are:

1. Baseline unstimulated mercury vapor intake.
2. Mercury vapor intake resulting from 3 meals and 3 snacks daily.
3. Ionic mercury intake from ingestion.

BASELINE UNSTIMULATED MERCURY VAPOR INTAKE:

This is the obvious starting point in the determination of patient exposure to mercury from amalgam fillings. Utilizing data from existing published research studies, we attempted to evaluate this intake in a previous issue of the Bio-Probe Newsletter.(1)