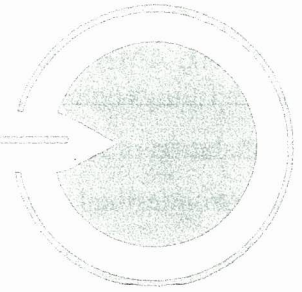


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ORIGINAL ARTICLE

DIETARY MERCURY VS AMALGAM MERCURY A RED HERRING ????

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The intention of this discussion is not to minimize the seriousness of mercury derived from the diet, but rather to place it in a rational scientific perspective compared to mercury exposure from dental amalgam fillings.

A number of individuals, in an attempt to justify continued use of mercury/silver dental amalgam fillings, have claimed that patient exposure to mercury from amalgam fillings is trivial compared to mercury intake from the diet, which is predominately methyl mercury derived from fish.

The position has been based on two premises: 1) The amount of mercury patients receive from dental amalgam fillings is negligible compared to the amount of methyl mercury received from the diet; and 2) methyl mercury derived from fish is more toxic than mercury vapor derived from dental amalgam fillings.

As we shall now see, both of these premises are contradicted by valid scientific documentation and are, therefore, false!

COMPARATIVE INTAKE

DIETARY MERCURY: Worldwide, a number of studies assessing the volume of intake of mercury from the diet have been done. In the United States, the Environmental Protection Agency (USEPA) determined that the average intake of mercury from the diet did not exceed 10 micrograms per day for the 154 pound adult. (1) This estimate is actually high, since the data provided by the USEPA in that document showed the average intake of mercury due to fish consumption to be 4.7 micrograms of mercury per day.

In 1988, Clarkson and associates stated that the average mercury intake from the diet in the U.S.A. was 2-7 micrograms per day for adults, 1 microgram per day for

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toddlers, and less than 1 microgram per day for infants. (2)

SUMMARY = 2-10 MICROGRAMS PER DAY FOR ADULTS.

DENTAL AMALGAM MERCURY: There are four routes by which mercury released from dental amalgam fillings enters the patient's body:

1. Inhalation of released mercury vapor.
2. Gastrointestinal absorption of mercury dissolved in foods and fluids.
3. Absorption of mercury through the mucosa of the oral (especially the gingival tissue) and nasal cavities.
4. Passage of mercury through the dentinal tubules of teeth into the blood vessels of the pulp and hence throughout the body.

Although the latter route has been scientifically demonstrated, there is absolutely no data available upon which conclusions can be drawn defining the amounts of mercury absorbed. Further although data is just starting to appear on absorption through the oral mucosa, the data is insufficient for inclusion in our intake calculations. There is, however, published data allowing definition of intake from the former two routes.

1. Inhalation of released mercury vapor: Several basic studies have been published that provide data allowing quantification of intake from mercury vapor released from dental amalgam. The recently published (February 1988) text "Biological Monitoring of Toxic Metals" devotes an entire chapter to this topic. (3) The authors are the world's leading experts on mercury toxicology; their credentials being beyond reproach. Based on data provided by four published basic studies, the authors calculated intake of dental amalgam mercury vapor derived from three meals per day (functional release) and the static release the remainder of the day. Their determinations were = 2.5 to 17.5 mcg/day. Bear in mind, this determination included only inhaled mercury vapor!

SUMMARY = 2.5 - 17.5 MCG/DAY BY INHALATION.

2. Ingestion of dissolved mercury: A number of studies have been published that demonstrate the dissolution of mercury in various test solutions. Care must be exercised in evaluating these studies because it has now been proven that mercury release in natural saliva is much greater than in artificial saliva. (4,5) In these studies, amalgam samples were suspended by string into test solutions for 24 hours and the static (non-functional) mercury release determined. In 1985, Brune and Evje measured dissolved amalgam mercury in natural saliva that occurred in 24 hours under static and functional conditions, using three daily periods of cyclic loading followed by brushing. They found an average of 18.0 micrograms of intake of mercury in the presence of 20 average-sized surfaces of amalgam. (6)

SUMMARY = UP TO 18.0 MCG/DAY BY INGESTION.

3. In a recent in vivo experiment, designed to determine the degree of mercury vapor absorption by the oral mucosa, it was found that half of a 28-32 ng Hg exposure was absorbed. The amounts of mercury used in this experiment are frequently found in vivo after chewing. (7) Based on the data provided it is apparent that the amount of amalgam filling mercury absorbed by the oral and nasal mucosa could be substantial. However, because there was no extrapolation of the data to a daily intake amount, the information is being presented only to emphasize the point that amalgam bearers have significant intakes through absorption not previously considered. Consequently, the amount of mucosa mercury absorption will be additive to any measurements already published demonstrating amalgam filling mercury release and intake.

4. Combined intake: To this point, only one study can be found that calculates the total intake from inhalation and ingestion together. It was done by the Occupational Safety and Health Administration in Sweden in 1987 and determined the mercury intake from dental amalgam under static conditions only,