

MERCURY POISONING from DENTAL AMALGAM — a Hazard to Human Brain

by

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During recent years a harsh debate has been going on regarding the risks of intoxication from the use of dental mercury amalgam. In the United States, as well as in some Western European countries, particularly in Sweden, various official statements, with information to the lay people, have been broadcast on TV and published in daily newspapers and in scientific journals.

In the United States for example, representatives of the American Dental Association and the National Institute of Dental Research have officially declared that "amalgam is safe" and that "the small amount of mercury released from amalgam dental fillings does not represent a health hazard except in those few individuals who may be hypersensitive to mercury". They have even stated that "when mercury is combined with the metals used in dental amalgam, its toxic properties are made harmless".

In Sweden, several highly distinguished persons, as representatives from the National Board of Health and Welfare, directors, university professors and chiefs from schools of dentistry and medicine have taken part in the amalgam debate. These individuals claiming to be amalgam experts have made statements on television such as, dental amalgam is a "stable" and absolutely "harmless" compound and "there has been no scientific evidence hitherto published that mercury from dental amalgam should produce symptoms of disease", and that "out of our present scientific knowledge, no reason exists to warn dentists against using mercury dental amalgam in their practice".

Regrettably, the public statements by these governmental authorities, are at the least deceptive and a distortion of the truth. It would appear they are trying to conceal scientific facts about amalgam intoxication that are well documented in earlier publications. These omissions have the effect of providing misleading information to the public. Therefore, I have found it necessary to present some basic facts concerning the amalgam problem.

CLINICAL SYMPTOMS OF MERCURY POISONING

The highly toxic effects of mercury are well known since antiquity, and detailed reports tell us about the symptoms among slave workers, heavily exposed to mercury fumes in the mines of Almaden, Spain.

The poisonous effect of mercury on the brain may express itself by various symptoms, but the cardinal sign of an *insidious* mercury intoxication is an extreme and irrational fatigue physical and mental. There is a total lack of every initiative, as the patient is incapable of starting any kind of new events, together with an inability to finish earlier projects.

Further symptoms are increased irritability, moodiness with unpredictable and sudden outbursts of anger, self-effacement, with lack of self-confidence, lack of concentration, loss of memory, timidity and shyness, introversion, unmotivated anxiety, and depression, often periodically. Because of these symptoms, mercury intoxicated persons have wrongly been considered to suffer from either "psychic" or "imaginary" illness, thereby missing or neglecting a correct diagnosis. Lesions of neuro-anatomic structures, responsible for these mental symptoms of mercury poisoning, are mainly localized to the hypothalamus, causing a dysfunction of the neuro-endocrine regulation via the hypothalamic-pituitary system.

Among more objective and apparent signs of mercury poisoning is a "stuffed nose", with dryness and a viscous, sticky, often bloody nasal discharge, due to the locally irritative effect of mercurial fumes. Irregular heart activity, periodically increased pulse rate, combined with "air hunger" are signs frequently occurring in a low-grade of mercury intoxication, particularly about an hour after intake of a meal, during which mercury from dental amalgam fillings has been released due to intense chewing.

Moreover, commonly occurring among mercury-intoxicated persons, but often overlooked diagnostically, are episodes of highly increased urinary output, 1-2 liters during the short period of a few hours. This periodically increased diuresis is probably due to the toxic effect of mercury on the posterior lobe of the *pituitary* gland causing a deficiency of the secretion of the anti-diuretic hormone vasopressin, similar to the lesion in diabetes insipidus.

DENTAL AMALGAM IS NOT A "STABLE" COMPOUND

Most people, patients as well as dentists, are fully aware of the simple fact that their own dental amalgam fillings will, sooner or later, undergo corrosion necessitating restorative work, possibly years later.

With regard to the rate of amalgam corrosion, basic scientific work on this phenomenon was done 60 years ago by Stock (1926). Today unfortunately, there are very few dentists and physicians who are aware of the following facts:

In vitro experiments, performed at a temperature of 30°C, demonstrated that mercury

amalgam pieces with a weight of 1 gram, sealed in a glass tube, during a period less than a month, gave off such a large amount of mercury vapor as up to 30 milligrams, i.e., about 1 milligram of mercury per day, or 1000 micrograms Hg daily, (Stock 1926).

Dental amalgam contains about 50% of metallic mercury, and the setting free of small mercury droplets on the surfaces of amalgam fillings is highly increased by mechanical stimuli, in particular by the heavy force of chewing. Several groups of researchers have measured the amount of mercury vapor in the mouth before and after chewing gum for 10 minutes. All could produce scientific proof that amalgams give off considerable amounts of mercury vapor during the normal process of chewing.

During rest, without any stimulation, one usually finds a value of 3-4 micrograms mercury per 1.0 m³ respiratory air within the oral cavity of amalgam-bearers. This resting value increases at least 10-fold by chewing, or through chemical or physical effects, like an augmented temperature in the oral cavity caused by intake of hot drinks, as scalding hot coffee or tea, consumption of citrus fruits or sour foods containing vinegar, and in particular by the co-existence of the two metallic compounds amalgam/gold, simultaneously within the oral cavity.

Out of the vast literature we may notice a report from the University of Iowa (Svare et al. 1981), demonstrating that the content of mercury within the oral cavity increased 15 times after chewing, with values up to about 90 micrograms Hg per 1.0 m³ air. Moreover, Harold Utt (1984) in California measured post-chewing concentrations up to 400 micrograms Hg per 1.0 m³ within the oral cavity. The last-mentioned concentration of mercury, measured in the respiratory air of the oral cavity, exceeds by more than 1000 times the Soviet Union permissible threshold limit value (TLV) of 0.3 micrograms Hg per 1.0 m³ which is the value the Soviet Union considers acceptable for its own inhabitants to breathe within their domiciles.

In this connection, it is noteworthy that the World Health Organization (WHO) has recommended a maximum allowable concentration (MAC) in working premises of up to 25 micrograms Hg per 1.0 m³ air. This limit value of 25 micrograms Hg per 1.0 m³ air, recommended by WHO, is often exceeded by many amalgam-bearers, which is why several authors have claimed that elemental mercury derived from amalgam fillings represents a significant and undesirable contribution to man's body burden of mercury, (Patterson et al. 1985, Vimy & Loescheider, 1985).

In this context, the *occupational* exposure of dental personnel should not be forgotten, as dentists in their daily work are highly exposed to mercury vapor. For example, by excavation of old amalgam fillings, at high speed drilling, a concentration of 800 mcg/Hg m³ is not uncommon (Cooley & Barkmeyer 1978).

HIGH CONTENT OF MERCURY IN PITUITARY GLANDS OF DENTISTS

In the February 22, 1986 issue of *Lancet*, Magnus Nylander, who works at the National Institute of Environment Medicine, Karolinska Institute in Stockholm, published his highly remarkable discovery that some *dentists* had a surprisingly high Hg-concentration in their pituitary glands, while simultaneously their occipital cortex showed considerably lower or almost "normal" values. Further results from an additional 25 autopsy cases, including 6 dentists and 1 dental nurse, are now available (Nylander et al. 1986, Nylander 1987) and are shown in Table 1.

On the one hand, 6 *dentists* and 1 dental nurse had very high concentrations of mercury within the pituitary gland, up to a value of 4000 nanograms Hg per 1.0 gram pituitary substance.

On the other hand, 2 endentulous individuals showed a value of only 5-6 nanograms Hg per 1.0 gram pituitary substance, thus a content 800 times less than in a dentist.

Most intriguing was Nylander's observations about the disparity between the high concentrations of mercury in the pituitary gland and simultaneously the rather low content of mercury in the cerebral occipital cortex among the dental personnel (see Table 1). How should one explain this discrepancy between the uptake of mercury in these various regions of the brain?

Table 1. *MERCURY CONCENTRATION IN PITUITARY GLAND AND BRAIN*
(25 autopsy cases - values in nanograms Hg/gram tissue)

	Pituitary Gland	Occipital Cortex	Ratio
<i>A: Occupationally Exposed</i>			
Case (1) Dentist	4040	300	14:1
Case (2) Dentist	2700	16	169:1
Case (3) Dentist	350	40	4:1
Case (4) Dentist	350	5	70:1
Case (5) Dentist	300	17	18:1
Case (6) Dentist	135	19	7:1
Case (7) Dental Nurse	1300	18	72:1
<i>B: Not occupationally Exposed</i>			
a) Amalgam-bearers			
Cases (8-23) Range	7-77	3-23	
Mean value	28	11	2.5:1
b) No Amalgam			
Case (24) Endentulous	10	6	2:1
Case (25) Endentulous	5	6	1:1

(By courtesy of Magnus Nylander, 1986, 1987)

DIRECT TRANSPORT OF MERCURY FROM ORO-NASAL CAVITY TO THE BRAIN

In order to elucidate the "amalgam problem" of today it is essential to recapitulate some older investigations. Fifty years ago the German chemist Alfred Stock (1936), conducted some experiments on himself in which he tested the inhalation of air containing 8 micrograms of mercury per 1.0 liter of air. After inhaling through his *nose*, a few breaths containing about 25 micrograms of mercury, he soon experienced dizziness, headache and a nasal catarrh. It took several days for all symptoms to disappear.

Some weeks later Stock repeated his self-experiment, but this time he inhaled the mercury vapor through his mouth. To his astonishment Stock found that by "mouth breathing" he could inhale 10 times the amount of mercury vapor (approximately 250 micrograms Hg) without getting any symptoms of intoxication, similar to those he had previously experienced by "nose-breathing". How did Stock explain the phenomenon that permitted him to inhale 250 micrograms Hg through his mouth without getting symptoms of mercury intoxication?

After having performed numerous analyses of the mercury content in various organs of the body, including the brain and the pituitary gland of about 60 autopsy cases, amalgam-bearers and non-amalgam bearers, as well as some studies on dogs (1936, 1939, 1940, 1942, 1943), Stock came to the following conclusions:

On the one side, by "nose-breathing", the mercury vapor settles down on the mucous membranes of the ethmoid region in the upper nasal cavity, from where the mercury is absorbed and passed further to the olfactory bulbs, and then directly to the brain. In this circumstance, the mercury can act in a much stronger concentration on the brain cells, as it by-passes the general arterial blood stream. Under this condition, even minor amounts of mercury might be highly perilous.

On the other side, by "mouth-breathing", the inhaled mercury vapor passes straight to the lungs, from where it is absorbed into the general arterial circulation and attenuated in the blood volume, over 4 liters. Moreover, it is also detoxified as it passes through the liver.

NOSE-BREATHING versus MOUTH-BREATHING

Recent studies have elucidated that mercury *vapor*, released from dental *amalgam*, is largely absorbed by the nasal mucosa, in particular by people exhaling through the *nose*. For example, Patterson et al. (1985) demonstrated that breath, exhaled through the *mouth*, contained 13-40 micrograms Hg per 1.0 m³ air. However, if the air was exhaled through the *nose* it contained only 0.2 to 0.3 micrograms Hg per 1.0 m³ air. This means that during exhalation through the *nose* grossly 100 times more mercury **disappeared** into the human body. One might really ask whereto did all this mercury vanish?

Regrettably, Patterson and his colleagues only commented upon the amount of mercury vapor entering the body via the lungs, where it is absorbed up to 80 percent. Similarly, most previous and present authors have totally overlooked this phenomenon of the "vanishing" mercury related to exhalation through the nose. The only possible explanation for disappearance of mercury vapor during expiratory passage through the nasal passage is that the mercury fumes released from dental amalgam fillings, by chewing, settle down on the nasal mucosa. From the nasal cavity, mercury is further transported directly to the brain and the pituitary gland, via open venous pathways and by the olfactory nerves (cf fig. 1)

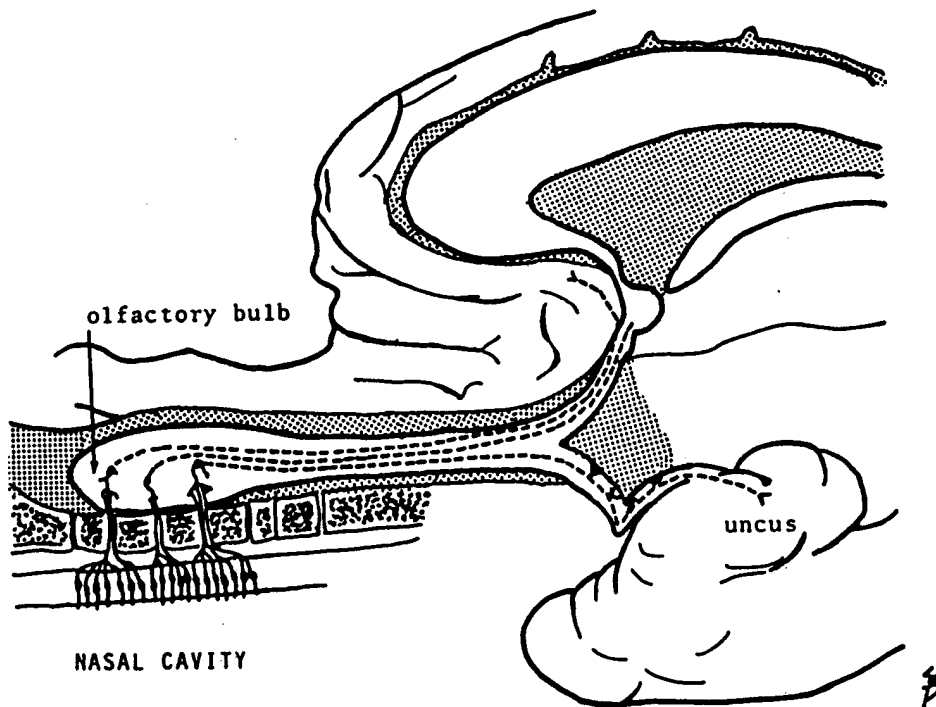


Fig 1. **OLFACTORY ORGAN - PATHWAYS FROM NASAL CAVITY TO THE BRAIN**
 From mucosa of the upper nasal cavity the fila olfactoria go through the lamina cribosa of skull base of OLFACTORY BULBS. Further fibers from olfactory bulbs pass in olfactory tract to the UNCUS in the temporal region of the brain. Similarly, MERCURY VAPOR, being released from dental amalgam and settled down on the nasal mucosa, may be absorbed and then transported along the OLFACTORY NERVE fibers to the BRAIN!

POSSIBLE PATHWAYS FOR MERCURY TRANSPORT

Let us have another look at the table. The disparity in the Hg-concentrations between the two regions, the occipital brain and the pituitary gland, can only be explained in the manner that mercury has arrived to these organs by two different ways of transport:

(a) Through the *general* arterial blood circulation, the occipital brain cortex as well as the pituitary gland have both received a certain, but minor amount of mercury.

(b) Moreover, the pituitary gland has received an "extra" supply of mercury by means of a *direct* transport from the nasal cavity to the cranial cavity. Unfortunately, the majority of physicians and dentists of today seem to be totally unaware of this *direct* transport of mercury to the brain and the pituitary gland.

Consequently, two principal factors are responsible for the accumulation of mercury from dental amalgam within the brain and the pituitary gland.

(1) *Chewing* causes the main release of mercury from dental amalgam fillings that settles on the mucous membranes in the oro-nasal cavity.

(2) The *direct transport* of mercury from the mucosa of the oro-nasal cavity to the brain and the pituitary gland takes place partly along the olfactory nerves, partly via the valve-less cranial venous system, all according to the "Principle of the Shortest Pathway" (Stortebecker 1961). As the mercury by this direct route totally by-passes the general arterial blood circulation, even minor amounts of mercury may be dangerous to the brain and pituitary gland.

HYPOTHALAMUS — PITUITARY GLAND

A steady feed-back takes place between the *pituitary* gland and the *hypothalamic* region at the base of the brain, in order to serve the regulation of all intricate hormonal and neural functions, necessary for maintenance of life.

As a whole, the *hypothalamic* region functions as a vital autonomic center, that regulates our "struggle for life" by influencing, for example, intake of FOOD and DRINK, HUNGER, THIRST, our body TEMPERATURE, ALERTNESS or SOMNOLENCE, INSOMNIA or SLEEP, our SEXUAL behavior, et cetera.

In view of recent findings of high contents of mercury in the pituitary gland (Nylander 1986, 1987), probably emanating from dental mercury, the dental status of all patients suffering from various endocrine and mental symptoms should be carefully scrutinized.

Hypothalamic lesions may manifest themselves as vegetative attacks, with symptoms of an irrational FATIGUE, heart PALPITATIONS, AIR HUNGER, SWEATING, a sensation of UN-REALITY, MOODINESS, ANXIETY, DEPRESSION, mixed with outbursts of ANGER, like RAGE, etc. This whole symptomatology, typical for a low-grade mercury poisoning, may very

well be explained as due to a release of mercury from *dental amalgam* fillings and its spread through a direct venous passage to the base of the brain.

TEETH AND BRAIN ARE CLOSE NEIGHBORS

The distance from the teeth of the upper jaw to the cranial cavity with the brain is only a few inches; and the principle of the "shortest pathway" holds true not only for mercury, but for a magnitude of *poisonous* compounds such as bacterial toxins and viruses, which might spread from the oro-nasal cavity directly to the brain and the pituitary gland, both along the olfactory nerves and via the valve-less cranial venous system (Störtebecker 1961, 1982, 1986).

Noteworthy in this connection is that Anders Ahlbom and coworkers at the National Institute of Environmental Medicine in Stockholm, investigated the cancer incidence among about 9000 dental personnel, half dentists and half dental nurses. They found that the encountered number of *malignant gliomas* of the *brain* corresponded to a *two-fold* increased risk for each of male dentists, female dentists, and dental nurses, seen in comparison to the general population.

Certainly, one might ask if cancer-causing agents can spread to the cranial cavity according to the principle of the "shortest pathway", i.e., directly from the oro-nasal cavity to the brain. This in particular, as the malignant gliomas are occurring 10 times more frequently in the anterior regions of the brain seen in comparison to their occurrence in the occipital lobes (cf Störtebecker 1982, 1986). Moreover, it is well known that mercury suppresses the immune defense mechanisms, which confers an increased sensitivity to all kinds of infections, as viruses, bacteria, and molds, in its turn enhancing tumor growth. The dentists should really consider the menace of using amalgam in their daily practice!

AMALGAM IN DENTAL PRACTICE — LACK OF ALL COMMON SENSE

With regard to the use of mercury amalgam, the dental practitioners are subject to rigorous and very detailed instructions from health authorities about how to handle dental amalgam, as e.g., to clean up every kind of small spillage, minute particles of amalgam in the spittoons, in the sewage system, on the floor, etc. Furthermore, the dentists are warned against every direct contact, not even with his hands to touch the amalgam. Consequently, amalgam seems to be a highly poisonous compound! However, medical and dental authorities, apparently without any reservations at all, recommend that this same highly toxic amalgam should be inserted into the mouth of alive human beings! The ambiguity of such action lacks all common sense and has no parallel in all the other fields of medicine.

ERRONEOUS DIAGNOSES COST BILLIONS OF DOLLARS

Numerous patients, who themselves have questioned if their symptoms of illness might originate from the teeth and be caused by a mercury poisoning from dental amalgam, have been gravely misdiagnosed by their dentists and physicians, and as a consequence have also been subjected to highly erroneous treatment, and even dealt with as suffering from "psychic" and "imaginary" illness.

The social and economic consequences to the individual and the community are enormous. The annual direct cost for treating these mercury poisoned patients, as suffering from "mental" disease, may be estimated to be billions of dollars for the faulty medical care related to incorrectly established diagnoses and treatment. Furthermore, caused by this dental and medical wrong diagnosis comes an approximately 10 times higher indirect cost, from loss to the gross national product and loss to federal taxes! Last, but not least, added to the national burden is the personal tragedy, which is hardly measurable in monetary terms.

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Certainly, it is high time that we all, medical and dental professionals as well as laymen, realize that mercury, being released from dental amalgam, is a big hazard to human health, and in particular to human brains.

At long last, medical and dental authorities should realize the sheer madness of deliberately poisoning mankind with mercury from dental amalgam, and consequently ban all further use of mercury amalgam. As a *self-protection* all dental patients should hereafter refuse to have any mercury amalgam implanted into their teeth!

REFERENCES — For detailed references and further scientific discussion the reader is referred to the following two books published by the author:

(1) **DENTAL CARIES as a cause of NERVOUS DISORDERS.** Epilepsy - Schizophrenia - Multiple Sclerosis - Brain Cancer. Additional notes on Myasthenia Gravis - High Blood Pressure. Stockholm: Störtebecker Foundation for Research 1982 (235 pages) ISBN 0-941011-01-1. Published in the USA by Bio-Probe Inc., Orlando, FL 1986.

(2) **MERCURY POISONING from DENTAL AMALGAM — A Hazard to Human Brain.** Stockholm: Störtebecker Foundation for Research 1985 (201 pages). ISBN 0-941011-01-1. Published in the USA by Bio-Probe, Inc., 1986, (213 pages).

[Editors Note: Books may be purchased directly from Bio-Probe, Inc., P.O. Box 580160, Orlando, FL 32858-0160. The price is \$20.00 each plus postage and handling costs of \$1.00 for the 1st book and \$0.50 for the 2nd book. U.S. Funds only.]