

## Letter to the Editor

### **Commentary regarding the article by Gottwald et al.: “Amalgam disease” – poisoning, allergy, or psychic disorder? Int. J. Hyg. Environ. Health 204, 223 – 229 (2001).**

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Sir,

in the study presented by Gottwald et al., we read with interest that 40 patients attributing physical complaints to their dental amalgam fillings were compared to 40 controls with amalgam fillings, but no associated complaints. No significant differences were found in the mercury levels in blood, 24-h urine and saliva between the two groups. However, in the patient group, atopy and affective or somatoform disorders were more frequent. The authors conclude that amalgam is not the cause of psychic or neurological disorders, and conclude that the appropriate therapy for these “amalgam patients” should be psychotherapy or psychiatric treatment.

We disagree with this conclusion, and question the methodological quality of the study:

1. In the study, two groups with approximately the same number of amalgam fillings were compared. Thus, it is not surprising that mercury levels (Hg) in blood and urine did not differ significantly. The question should really be: Are physical, psychic or somatoform disorders more frequent in individuals with dental amalgam or a history of it compared to individuals that have never been exposed to amalgam?

2. Hg levels in blood and urine (which only represent 7% of the body) do not reflect Hg body burden (Lorscheider and Vimy 1990, 1991; Hahn et al., 1990; Drasch et al., 2001) and only 1% of Hg is detoxified via urine (Lorscheider et al., 1995).

Nevertheless, urinary excretion of Hg is up to 100 times greater when challenged (Aposhian, 1998), and thus a challenge provides a better diagnostic tool for estimating Hg in body tissues, but not in the CNS (Aposhian et al., 1992; Aposhian, 1998).

3. Amalgam is the most important source of Hg in humans (WHO, 1991). About 70% of total Hg in urine is derived from amalgam (Aposhian, 1998). Studies show a 4.5-fold increase in the amount of total Hg (inorganic and organic!) in the urine of persons with dental amalgam compared to unexposed controls (Kingman et al., 1998). The release of Hg in vitro was 43.5 µg Hg per cm<sup>2</sup> amalgam/day (without exposure to pressure, galvanism or heat that occur in mouth) and remained constant for the study duration of 2 years (Chew et al., 1991). Hg from amalgam is partly transformed by microorganisms to more toxic and completely absorbable organic Hg (Yannai et al., 1991; Leistevo et al., 2001). Autopsy studies show significantly higher Hg levels in brain and other body tissues in subjects with dental amalgam and Hg levels correlate significantly with number and age of dental amalgam (for review see (Lorscheider et al., 1995; Drasch et al., 1994)). Therefore, history and age of dental amalgam should be taken into account in the groups.

4. In contrast, other investigators have shown neurobehavioral and psychological effects through exposure to Hg in dental amalgam (Echeverria et al.,

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1998; Bittner et al., 1998; Sibley, 1989, 1992; Sibley et al., 1993, 1994).

5. Many publications even suggest a connection between Hg and neurodegenerative diseases such as Alzheimer's disease (AD) (for review see (Lorscheider et al., 1995; Ely, 2001; Olivieri et al., 2000)). The study cited by Gottwald et al. as proof of there being no connection between Hg and AD (Saxe et al., 1999) was published in a dental-association-trade journal, which is not a peer-reviewed, scientific journal.

6. One must also keep in mind *i*) The role of the interindividual variability of enzymes in Hg detoxification; *ii*) possible non-dosis-related, Hg-induced autoimmunity; and *iii*) the synergistic action of two or more toxicants (e.g. tin, copper, zinc and silver from amalgam, lead, cadmium etc) i.e., if Hg and Pb are combined at LD1 levels, the killing rate will be 100% (LD100) (Schubert et al., 1978).

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