

Blood mercury content after chewing

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According to some studies (1–5), chewing on amalgam fillings increases substantially the release of mercury vapor from the amalgam. It was discussed in these studies whether the daily dose of mercury from inhaled air might exceed the dose obtained when the occupational limit recommended by the WHO ($50 \mu\text{g}/\text{m}^3$) is reached. The possible association of an increased mercury level in air with blood mercury content was, however, not reported in those articles.

A mercury level of $50 \mu\text{g}/\text{m}^3$ in air is associated, on a group basis, with a blood mercury concentration of approximately $175 \text{ nmol}/\text{l}$ (6). Therefore, if the estimated inhaled mercury amounts reported in the above-mentioned studies (1–5) are correct, those amounts would be expected to increase the blood mercury level to $175 \text{ nmol}/\text{l}$.

The purpose of this study was to investigate whether chewing on amalgam fillings can release enough mercury to increase the blood mercury level to $175 \text{ nmol}/\text{l}$.

The news media and various pamphlets have stated that the release of mercury from amalgam fillings has, in some cases, led to chronic mercury poisoning. Consequently, individuals with undiagnosed subjective symptoms, such as those related to serious

mercury poisoning, have focused their suspicion on their amalgam fillings.

Since 1985 some of these persons have sought help from our dental clinic. In connection with their visit, a blood sample (5 ml) was drawn from the arm vein, to measure the mercury content of whole blood. The sample was taken after they had chewed a 1-g piece of paraffin for 30–60 min. The blood was drawn from the vein 15 min after the chewing was finished.

The average age of the 35 patients (27 women and 8 men) was 45 years, varying between 20 and 63 years. Every patient had at least 10 large occlusal amalgam fillings.

The blood sample was analyzed for mercury at the Oulu Regional Institute of Occupational Health (Oulun aluetyöterveyslaitos), using atomic absorption spectrophotometry connected with the cold vapor method (7). The cold vapor method makes it possible to monitor organic and inorganic mercury from whole blood separately. This method has been used at the Oulu Institute since the mid-seventies to monitor inorganic mercury in persons who are occupationally exposed to it in chloride-alkaline factories in Finland.

The results are given in Table 1. The total

Table 1. Total and inorganic blood mercury concentration (nmol/l) in patients after chewing

| Total blood mercury concentration, nmol/l | No. of patients | Inorganic blood mercury concentration nmol/l | No. of patients |
|---|-----------------|--|-----------------|
| 10 | 4 | 5 | 16 |
| 15 | 14 | 10 | 16 |
| 20 | 4 | 15 | 1 |
| 25 | 7 | 20 | 2 |
| 30 | 5 | | |
| 35 | 1 | | |

mercury content of the blood of every patient was within the normal limits (< 50 nmol/l) and much lower than the WHO risk value (250 nmol/l) (Table 1). The average total blood value in the Finnish population is reported to be 18.5 nmol/l (8), when measured in people living in 15 different parts of the country. Fish-eating persons living in Lapland were exceptional, showing average blood levels of 55–220 nmol/l Hg.

The present values for inorganic mercury were not increased as a result of the large amalgam fillings, not even when these were 'activated' by paraffin chewing. Thus, the results do not support the estimations of the mercury content in inspired air in some studies (1–5). On the contrary, the results agree with those of a recent study (9) in which no significant increase in mercury vapor levels were observed after chewing.

The overall low inorganic mercury values in all the 35 patients with numerous large amalgam fillings confirm the generally accepted concept (10) about the safety of using amalgam.

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