

See discussions, stats, and author profiles for this publication at:  
<http://www.researchgate.net/publication/235899060>

# Recovery from amyotrophic lateral sclerosis and from allergy after removal of dental amalgam fillings.

ARTICLE *in* THE INTERNATIONAL JOURNAL OF RISK & SAFETY IN MEDICINE · JANUARY 1994

---

CITATIONS

4

---

DOWNLOADS

122

---

VIEWS

72

2 AUTHORS, INCLUDING:



Jaro Pleva

Corrosion engineering, dental a...

13 PUBLICATIONS 90 CITATIONS

SEE PROFILE

RISMED 00186

### Case Histories

# Recovery from amyotrophic lateral sclerosis and from allergy after removal of dental amalgam fillings

Olle Redhe and Jaro Pleva

*Falun, Sweden*

(Accepted 4 April 1993)

---

**Key words:** Dental amalgam; Mercury; Neurotoxicity; ALS; Immunotoxicity; Allergy

---

## Introduction

In the debate about the possible risks with mercury released from dental amalgam fillings (DA), an important point is whether DA can cause serious, pernicious diseases.

The following two patient cases are a contribution to this debate. They are translated from the Swedish original [1], which contains an evaluation of 100 cases of poisoning and immunological effects in dental amalgam patients, documented in clinical practice, including recovery from most symptoms after amalgam removal. Twenty-four of the cases have been documented in more detail, some with colour photographs. The present cases are complemented by a discussion and some references to relevant literature.

## Case 1: Amyotrophic lateral sclerosis ALS

*Patient.* Woman 29 years (1984), nursery school teacher.

The patient had suffered for a long period from neurological problems. According to her clinical record, the symptoms began many years back with hoarse voice,

---

*Correspondence to:* Olle Redhe DDS, R-Dental AB, Frejavägen 33, S-79133, Falun, Sweden.  
First person singular, used in the text, relates to the first author, (O.R.).

painful swallowing, a feeling of dry mucuous membranes and joint pains. She had also visited her physician, complaining of psychical and physical fatigue and tremor. She was repeatedly disabled from work for weakness and was treated with gymnastics for weakness of the neck. The treatment did not improve her condition and the fine motor capability of hands continued to deteriorate. Uncertain gait caused difficulties in stairs, and speech disturbances appeared. Twitching in small muscles appeared in the face, tongue, neck, arms, shoulders, back and lower extremities.

In 1984 a diagnosis of amyotrophic lateral sclerosis (ALS) was made at the department of neurology of the University Hospital in Umeå, Sweden. An excerpt from the electromyographic report of January 1984 referred to:

“High grade neurogenic damage: M. extensor digitorum brevis dx.  
 Medium neurogenic damage: M. extensor digitorum brevis sin.  
 Mild neurogen damage: M. tibialis anterior bilat. and  
 M. interosseus dorsalis I bilat.

In the lower extremities a rather accentuated peripheral neurogen damage is visible, most pronounced on the right side. Bilaterally the hands show mild neurogenic changes. All conductivity velocities are normal. The picture may be consistent with a motor neuron disease.”

No further visit to the clinic was proposed, as the disease is pernicious and there is no known therapy for ALS.

In the spring of 1984 the patient visited the dentist (O.R.) for consultation, suspecting — as a last chance — a connection between her teeth and certain of her symptoms.

From his prior experience, the dentist (O.R.) recognized the symptoms as those familiar in the patient group with health problems attributable to dental amalgam fillings. The patient’s own written history, presented at the first visit, included a description of several general symptoms remote from the oral cavity, which had appeared in conjunction with previous dental treatments. Her earliest symptoms had coincided with antibiotic treatment for a severe cold. After insertion of a DA filling (tooth 26) during this period the patient wrote:

“A few days later I got a terrible headache, continuing day and night for 3 weeks. Afterwards I was very tired, had pain in ears and felt absent. At a dance my partners felt the tremor. Earlier, I had engaged in traditional dancing for 12 years without anybody noticing anything similar”.

And further:

“After the dance we had a coffee break as usual, but my hands shook so that it was nearly impossible to hold the cup of coffee. From then onwards a miserable time followed. I could not manage my work, either physically or psychically, but repeated visits to the doctor did not help. I had an aversion to eating with my colleagues, because of their comments on my shaking. I missed my self-confidence. My friends commented on my forgetfulness and lack of concentration, they wondered if I slept well at night. It was laborious with all questions I could not answer. I got the feeling that my absence from work was taken to be deliberate, since nothing really wrong with

me could be found. Finally the doctor gave up and told me he could not see anything wrong with me. It must be nervous problems. He prescribed nerve medicine."

One year after the initial insertion of amalgam filling in the left upper side (tooth 26) it was necessary to renew the filling. The patient wrote: "Some days after the dental treatment I noticed difficulty in speaking (slurred speech). The tongue was like a lump." All the time she suffered from a dry mouth and pain in the pharynx and behind the nose.

When examined dentally early in 1984, the patient had 28 teeth in good condition, of which 13 were unfilled. There were 34 tooth surfaces filled with DA. The fillings appeared well done, most of them shallow and of moderate extent. No restorations other than amalgam fillings were present and no teeth were root filled [1,18]. The oral hygiene was exemplary, periodontal status unremarkable. There were minor occlusion discrepancies, which possibly could explain some of the symptoms. The total symptomatic picture, however, combined with the observed temporal connections between dental therapy and symptoms, tended to support the hypothesis of some form of sensitivity to the dental filling material.

With the consent of the patient and in the light of his clinical experience, the dentist decided to remove all DA fillings and replace them with alternative material. The treatment was completed in March 1984. Removal of the first filling in tooth 26, which had given the patient problems, resulted in an immediate increase in the severity of symptoms; headache, cold fever, asthma and respiratory difficulties appeared during the first night after the treatment. Sleep was disturbed, the hands began to shake and pain in the abdominal tract appeared as in the beginning of the disease. Thereafter the period of disturbance and removal of the fillings continued to be marked by exacerbation of her symptoms.

Headache continued, with an increase in fatigue, nausea and vertigo as well as difficulties in swallowing and jerking of the palate (*palatum molle*). The patient would awake with jerking of the calf muscles, the feet became red and warm. Jerking in the muscles of the legs also appeared in the daytime. Other symptoms included pain in the eye muscles, dim vision and sensations of severe cardiac arrhythmia.

The last amalgam filling was removed on 27 March 1984, following which the entire condition rapidly improved. Six weeks after final removal the patient reported that she now was able to go up stairs without experiencing back pains. Pains in the mouth also receded and the sore throat, present during the whole history of the disorder, recovered.

Five months after the completion of DA removal (29 August 1984) the patient was called for a week-long investigation at the same University clinic where the diagnosis ALS had been made. She felt now extraordinarily healthy and her health status was also confirmed by the words in her record:

"The neurologic status is completely without comment. Hence, the patient does not show any motor neuron disease of type ALS. She has been informed that she is in neurological respect fully healthy."

The medical clinic, it may be noted, was informed of the dental treatment but apparently chose not to follow up this issue or to consider its possible relevance to the patient's recovery.

All the same, one must quote verbatim from an EMG report on the patient in August 1984 (after DA removal and supplementation with selenium and vitamin E):

"In comparison to the previous investigation the visible changes are considerably smaller. Now, only a medium denervation of short toe extensors can be seen. The conductivity is normal. An explanation of the syndrome was probably mercury-angiopathy in the spinal cord."

At the time of writing (early 1993), 9 years have elapsed since removal of the DA fillings, and the patient continues to enjoy good health.

### *Discussion*

This is an informative case pointing to one possible type of neurological disturbance precipitated by metallic dental restorations in sensitive patients. As the average exposure to amalgam mercury may considerably exceed what are regarded as safe limits [2], it is reasonable to anticipate a fair incidence of adverse effects. Though there are documented effects of mercury in various chemical forms variously affecting the immune system [3], endocrine glands [4], kidneys [5], sensory organs [6], gut [7] etc., the main compartment influenced is the nervous system [8]. The symptoms are well known from both occupational exposures [9] and, increasingly, from clinical experience with amalgam poisoned patients [1,10,11].

The case may gain in interest after comparison with published investigations on ALS victims, which showed a significant increase in mercury and Hg/Se molar ratio in brain, motor region and in blood [12]. The mechanisms of motor neuron degeneration with respect to ALS have been discussed in recent work by Arvidson [13]. The distribution of mercury within the brain stem and spinal cord of mice was investigated after intramuscular administration of a single dose of mercuric chloride. The observed selective accumulation of mercury in the spinal cord and brain stem motor neurones was most probably due to a leakage of metal-protein complexes from capillaries in muscle into myoneural junctions, followed by uptake into nerve terminals and retrograde axonal transport.

Potential amalgam mercury involvement cannot be excluded also in a number of other syndromes of unknown etiology, which have been described since the introduction of DA around the year 1820 [2]. It may be noted that in both multiple sclerosis [14] and Alzheimer disease [15] elevated concentrations of Hg have been found in parts of the central nervous system, and there is also some animal evidence [16] that inorganic Hg is involved in the etiology of Alzheimer disease.

The case reported here seems to point to the extraordinary capability of the organism to recover as soon as the etiological factor has been eliminated. Clinical experience indicates that amalgam removal gives good results in neurological



disorders such as ALS and MS, as long as the irreversible neurological damage has not progressed too far.

## Case 2: Allergic problems

*Patient* Girl, 15 years, student.

This patient had suffered from the time of birth onwards from allergic problems. She was born with eczema, and at the age of 5 she developed severe asthma, making daily medication unavoidable. During the whole adolescent period she was often hospitalized.

She had also suffered from severe headache for as far back as she could remember; the headaches were considered to be inherited, as both her father and grandfather had the same problem. Another symptom was double vision which troubled her for several years at the age of about 7–10 years.

*Dental history.* The girl received her first amalgam filling at the age of only three years, given by one of the present authors (O.R.). Unfortunately, she showed high caries activity and at 5 years of age all the temporary cheek teeth were repaired with amalgam. Her asthma proved to have developed 4 months after filling two deep cavities with amalgam.

The ultimate number of amalgam surfaces was 11 (seven fillings); no other restorations were present. All oral tissues were in perfect condition. The occlusion was of s.c. open type, predisposing for occlusal disturbances; the occlusal imperfections could have been a possible explanation for the headache. The abraded teeth 13 and 23 indicated a bilateral mediotrusion-interference.

In the spring of 1984, after the girl had been unable to take up a scholarship in the USA because of her asthma problems, removal of amalgam was suggested. The mother initially argued that her daughter had suffered from allergy since her birth, "... and she was hardly born with amalgam fillings!" This is a frequent argument, but the fact is often overlooked that mercury from a mother's amalgam fillings may affect the fetus. Health authorities in some countries have indeed recently warned against amalgam treatment during pregnancy [17].

In the mother's case, a very large amalgam filling was made in tooth 16 during her pregnancy. This filling was also exposed to an intermittent contact with a gold crown in the opposite tooth. The galvanic cell amalgam–gold is known to release substantially more mercury due to increased corrosion rate of amalgam, compared to amalgam alone.

Both mother and daughter were informed of the current controversy, with some researchers raising the possibility of immunologic and allergic reactions, whereas the professional authorities tend to deny any risk of systemic reactions from dental mercury. Having considered this information, the mother agreed to amalgam removal in her daughter.

In a first sitting (22 October 1984), only one filling was substituted by composite. In mercury-susceptible patients, aggravation of health problems during treatment is frequent, but most often of a temporary character. After the first removal, the patient indeed had headache for several days; this was notable in view of its low incidence during the months before the treatment.

In the second sitting (5 November 1984), two fillings were removed. Two weeks thereafter she reported changes in her allergic reaction to contact with a dog; tear formation was more marked, but the usual swelling around the eyes did not appear.

At a third sitting (19 November 1984), a further filling was removed and substituted by composite. At follow up, the patient reported that the headache had ceased, but tears were now running constantly from both eyes, and the left eye was reddened. The nasal mucosa was now swollen. The patient noted with surprise eczema in the inner elbow bend of the arms, which had always appeared in the spring, but never in December.

At a fourth sitting (3 December 1984), the last three amalgam fillings were removed. Two months later the patient's symptom diary recorded intermittent headaches and running eyes; the skin of the scull became dry and large flakes loosened at the hair bottom, phenomena previously not observed. She also developed eczema over large areas of the body. She had a sensation of a dry, fragile and stretched skin, as if it was near rupturing. On some days she had an itching rash all over the body. Her mother remembered that she had observed similar symptoms when her daughter was only 2–6 years old. Both she and her daughter were reassured that the flare-up of symptoms after amalgam removal was probably a transient reaction of the body after complete removal of amalgam.

During this period, dental treatment was concluded to correct the open occlusion [18] and restore cuspidoprotection, a grinding technique being used.

Six weeks later the eczema on the inner side of elbows was in course of disappearing. A very encouraging fact at this point was that the patient now could stop the medication against asthma, for the first time since the age of 5, without problems. Seven months further on, the patient returned from a long summer visit to the southern USA. All eczema and asthma was now absent, despite the hot and humid climate and exhaust gases to which she had been exposed, factors which earlier had seriously aggravated her symptoms.

Today, January 1993, the patient has been in full health for 8 years.

### *Discussion*

The case described is in our opinion an example of amalgam mercury effects on the fetus and results of prenatal mercury exposure on immunological disturbances in the young individual.

Though such clinical observations are not scientific proof of the mercury effects on the fetus, they nevertheless give support to such an explanation. The large amalgam filling which the mother received during pregnancy, and the contact with

a gold crown, are two important factors which might be relevant in the mercury etiology of the health disturbances in the fetus. Fresh amalgam fillings release substantially more mercury during the initial months, than later [19,20]; contact between amalgam and gold results in strong galvanic corrosion of the amalgam and up to two orders of magnitude higher release of mercury, compared to an amalgam filling alone [21]. The ability of mercury to cross the blood-brain and placental barriers is known [22,23] and led both the Swedish and German health authorities to introduce restrictions in amalgam therapy in pregnant women [17]. Animal research has shown that relatively short exposures to mercury vapour result in neurological damage in the fetus and increased rate of miscarriages and neonatal mortality [22].

The effects of mercury on the immune system have been reported in a number of papers [3,4,24,25,26,27,28] and reviewed by Hanson [29] and it is remarkable that no attention is being devoted to the apparent role of dental mercury in the increasing problem of allergy and other immunologic disorders.

Finally, one may add that the mother of the present patient, in view of the recovery of her daughter, subsequently provided an account of her own long-term symptoms, which were similar to those of many other amalgam patients, and discussion led to the decision to remove amalgam fillings in the mother as well. She reacted with strong aggravation of symptoms during removal of fillings. As usual, after complete removal the symptoms declined.

## References

- 1 Redhe O. Sjuk av amalgam (Sick from amalgam). R-Dental AB, Frejavägen 33, S-79133 Falun, Sweden (in Swedish).
- 2 Pleva J. Mercury from dental amalgams: exposure and effects. *Int. J. Risk & Safety Med.* 1992;3:1–22.
- 3 Shenker BJ, Rooney C, Vitale L, Shapiro IM. Immunotoxic effects of mercury compounds on human lymphocytes and monocytes. I. Suppression of T-cell activation. *Immunopharmacol. Immunotoxicol.* 1992;14:539–553.
- 4 Trachtenberg IM, ed. Chronic effects of mercury in organisms. Transl. from Russian. U.S. Dept. of Health, Education and Welfare, DHEW Publ. 74–473, 1974.
- 5 Vimy MJ, Boyd ND, Hooper DE, Lorscheider FL. Glomerular filtration impairment by mercury released from dental “silver” fillings in sheep. *Physiologist* 1990;33:Abstract A-94.
- 6 Mazzei F, Costa F. Changes in the ear in mercury vapor poisoning. *Arch. Ital. Laryngol.* 1956;64:106–114 (in Italian).  
Costa F, Mazzei F. Changes in the olfactory organ in mercury vapor poisoning. *ibid.* 1956;64:129–137. [English translation available from the present authors.]
- 7 Aaronson RM, Spiro HM. Mercury and the gut. *Digest Dis.* 1973;18:583–594.
- 8 Chang LW. Neurotoxic effects of mercury — a review. *Environ. Res.* 1977;14:329–373.
- 9 Von Oettingen WF, ed. Poisoning. A Guide to Clinical Diagnosis and Treatment. Saunders Co. 1958.
- 10 Hanson M. Changes in health caused by exchange of toxic metallic dental restorations. *TF-Bladet (Bull. Swed. Assoc. Dent. Mercury Patients)* 1986; No.1, ISSN 0349-263X.
- 11 Pleva J. Mercury poisoning from dental amalgam. *J. Orthomol. Psychiat.* 1983;12(3):184–193.
- 12 Khare SS, Ehmann WD, Kasarskis EJ, Markesbery WR. Trace element imbalances in amyotrophic lateral sclerosis. *Neurotoxicology* 1990;11:521–532.



- 13 Arvidson B. Inorganic mercury is transported from muscular nerve terminals to spinal and brainstem motoneurons. *Muscle Nerve* 1992;15(10):1089–1094.
- 14 Ahlrot-Westerlund B. Multiple sclerosis and mercury in cerebrospinal fluid. 2nd Nordic Symp. on Trace Elements in Human Health and Diseases. Odense, Denmark 17–21 August 1987.
- 15 Wenstrup D, Ehmann WD, Markesbery WR. Trace element imbalances in isolated subcellular fraction of Alzheimer's disease brains. *Brain Res.* 1990;553:125–131.
- 16 Duhr E, Pendegrass C, Kasarskis E, Slevin J, Haley B.  $Hg^{2+}$  induces GTP-tubulin interactions in rat brain similar to those observed in Alzheimer disease. 75th Annu. Meet. FASEB, Abstr. No. 493, Georgia, 21–25 April 1991.
- 17 Amalgame in der zahnärztlichen Therapie. German Bundesgesundheitsamt BGA, Berlin 1992, ISBN 3-89254-129-9.
- 18 Redhe O. Invalidiserande huvudvärk — ett onödigt ont. (Invalidizing headache — an avoidable evil.) R-Dental AB, Frejavägen 33, S-79133 Falun, Sweden.
- 19 Borinski P. Die Herkunft des Quecksilbers in den menschlichen Ausscheidungen. *Zahnärztl. Rundschau* 1931;40:223–230.
- 20 Malmström C, Hanson M, Nylander M. Amalgam-derived mercury in feces. Trace Elements in Health and Disease, ISTERH, 3rd Int. Conf., Stockholm, Sweden, 25–29 May 1992.
- 21 Pleva J. Corrosion and mercury release from dental amalgam. *J. Orthomol. Med.* 1989;4(3):141–158.
- 22 Goering PL, Galloway WD, Clarkson TW, Lorscheider FL, Berlin M, Rowland AS. Toxicity assessment of mercury vapor from dental amalgams. *Fundam. Appl. Toxicol.* 1992;19:319–329.
- 23 Chang LW, Hartmann HA. Blood–brain barrier dysfunction in experimental mercury intoxication. *Acta Neuropath. (Berl.)* 1972;21:179–184.
- 24 Contrino J, Marucha P, Ribaldo R, Ference R, Bigazzi PE, Kreutzer DL. Effects of mercury on human polymorphonuclear leukocyte function in vitro. *Am. J. Pathol.* 1988;132:110–118.
- 25 Eggleston DW. Effect of dental amalgam and nickel alloys on T-lymphocytes: preliminary report. *J. Prosth. Dent.* 1984;51:617–622.
- 26 Eedy DJ, Burrows D, Clifford T, Fay A, Path MRC. Elevated T-cell subpopulations in dental students. *J. Prosth. Dent.* 1990;63:593–596.
- 27 Bencko V, Wagner V, Wagnerova M, Ondrejcek V. Immunological profiles in workers occupationally exposed to inorganic mercury. *J. Hyg. Epidem. Microbiol. Immunol.* 1990;34:9–15.
- 28 Katsunuma T, Iikura Y, Nagakura T, Saitoh H, Akimoto K, Akasawa A, Kindaichi S. Exercise-induced anaphylaxis: improvement after removal of amalgam in dental caries. *Ann. Allergy* 1990;64:472–475.
- 29 Hanson M. Mercury bibliography. Over 12000 titles. Available from Doc. Mats Hanson, Nils Påls väg 28, S-24014 Veberöd, Sweden.