Food and Drug Administration

Dental Products Panel of the Medical Devices Advisory Committee

Health Improvement Following Amalgam Removal & Treatment for Chronic Mercury Toxicity

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Alhambra, CA
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Gaithersburg, MD

Disclaimer & Revisions

The information presented and opinions expressed herein are those of the author, Robert F. Cartland, and do not necessarily represent the views of the Raytheon Company and/or its partners; the Optical Society of Southern California (OSSC); The Optical Society of America (OSA); the Institute of Electrical and Electronics Engineers (IEEE); the IEEE Photonics Society, or any other professional society or organization. The above disclaimer was added on December 16, 2010 when this document was publically released.

This revised version was prepared on January 25, 2011. A Raytheon branded image has been removed from the title page and my contact information changed to my personal email address. The image on page 3 was replaced with a freely available image from wikipedia.org. The remainder of the presentation has been unchanged from the original public presentation made on December 14, 2010 before the Dental Products Panel of the Medical Devices Advisory Committee of the Food and Drug Administration.

Professional Background & Accomplishments

Robert F. Cartland

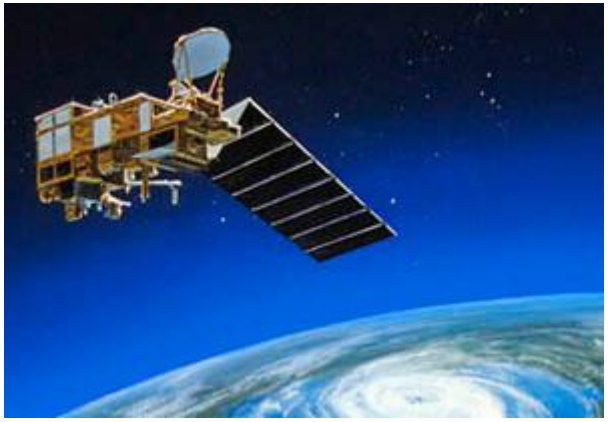
Senior Physics Engineer

Raytheon Space and Airborne Systems www.raytheon.com

El Segundo, CA (Optics and Lasers Department)

Technical Manager, Spectrophotometry and Scatter Laboratory

Electro-optic/infrared Sensors for Space & Airborne Systems



http://en.wikipedia.org/wiki/NPOESS

BA Physics, Oberlin College

MS Electrical Engineering-Electrophysics, University of Southern California

Published technical papers on design, fabrication and testing of optical and photonic devices

Robert Cartland, "Measuring Optical Scatter at Material Interfaces Using a Hemisphere," Paper ThD5/PThD5, 2010 Optical Society of America Topical Meeting, Optical Interference Coatings, Tucson, AZ (2010).

Member of the Institute of Electrical and Electronics Engineers (IEEE), the IEEE Photonics Society, the Optical Society of America and the Optical Society of Southern California (OSSC). Served on the board of directors of the OSSC since 2005 filling seven different appointed or elected positions including **President in 2009-2010 and Webmaster 2009-2011**.

OPTICAL SOCIETY OF SOUTHERN CALIFORNIA

www.ossc.org

…and I believe I have suffered & recovered from amalgam related illness

Personal History of Health Decline

http://en.wikipedia.org/wiki/Amalgam_(dentistry)

- 8 Molars with amalgam restorations placed as child/teen
  - Two in each quadrant
  - Began experiencing troublesome health concerns in mid twenties
- ~1998 (age 32) **health problems** were severely impacting quality of life **preventing full-time employment**
  - Sought traditional medical treatment including physicians, neurologist, physical therapists, chiropractors & mental health counselors.
- 2000 (age 34) suspected health might be impacted by dental amalgam. Discussed issue with faculty members at USC School of Dentistry and was told amalgam restorations were safe.
- In 2002 (age 36) researched the issue expecting to find little or no scientific work on the subject. Surprised to find hundreds of papers supporting dental amalgam concerns including the assessment of over 700 papers by Maths Berlin (Professor Emeritus of Environmental Medicine and investigator of amalgam related health issues for the Swedish Government).
- 2002 Initiated treatment for amalgam related chronic mercury toxicity

Trusting the medical and dental community delayed treatment for two years

Mercury Related Symptoms Personally Experienced (Page 1)

- **Oral Cavity Disorders (4)**
  - bleeding gums
  - gingivitis
  - metallic tastes
  - white patches in mouth
- **Gastrointestinal Effects (5)**
  - abdominal cramps
  - nausea
  - bloated feeling
  - diarrhea or constipation
  - headache after eating
- **Cardiovascular Effects(2)**
  - tachycardia (rapid heart beat)
  - angina
- **Respiratory Effects (2)**
  - persistent cough
  - difficulty in breathing
- **Neurological Effects (13)**
  - chronic or frequent headaches
  - slurring of words
  - slight stammering
  - difficulty in pronunciation of words
  - blurred vision
  - frequent leg cramps
  - ringing or noises in ears
  - dizziness
  - fine tremors (hands, feet)
  - twitching of face and other muscles
  - loss of coordination
  - numbness, tingling or pain in the extremities
  - sciatica

References:

Toxicological Profile for Mercury,

US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, March 1999

http://www.atsdr.cdc.gov/toxprofiles/tp46.pdf

http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=115&tid=24

Andrew Hall Cutler, PhD, PE, *Amalgam Illness: Diagnosis and Treatment, 1999*

http://www.noamalgam.com

Consumers for Dental Choice http://www.toxicteeth.org/MercurySymptoms.doc

Several symptoms were diagnosed and being treated prior to personal knowledge of symptoms related to mercury poisoning

Mercury Related Symptoms Personally Experienced (Page 2)

- **Emotional & Psychological (21)**
  - irritability
  - outbursts of temper
  - low self control
  - stress intolerance
  - resentment of criticism
  - loss of self-confidence
  - timidity, fearfulness
  - shyness
  - embarrassment with insufficient reason
  - self-consciousness
  - anxiety, nervousness
  - indecision
  - insomnia
  - vivid dreams
  - lack of concentration
  - memory loss
  - decline of intellect
  - depression
  - lethargy & drowsiness
  - brain fog
  - suicidal thoughts or tendencies
- **Immunological Effects (6)**
  - allergies
  - sinusitis
  - swollen lymph nodes in neck
  - excessive itching
  - rashes, skin irritation
  - repeated fungal infections
- **Endocrine Effects (7)**
  - subnormal temperature
  - low grade intermittent fever
  - night sweats
  - fatigue
  - muscle weakness
  - joint pain
  - loss of appetite

Personally Experienced 60 Symptoms Consistent with Mercury Toxicity

Amalgam Illness Treatment Plan

- **Nutritional Supplements (to counter effects of mercury)**
  - Antioxidants: Including Vitamin C, E, B
    - Based on theory mercury damages cells through oxidation
  - Essential Fatty Acids: Including Flax Oil, Fish Oil (Omega 3 and Omega 6)
    - Based on theory mercury damages lipids in cell membranes
  - Minerals: Including Se, Zn, Ca, Mg
  - Amino Acids: Including Glutamine
    - Part of tripeptide glutathione associated with mercury excretion

http://en.wikipedia.org/wiki/B_vitamins

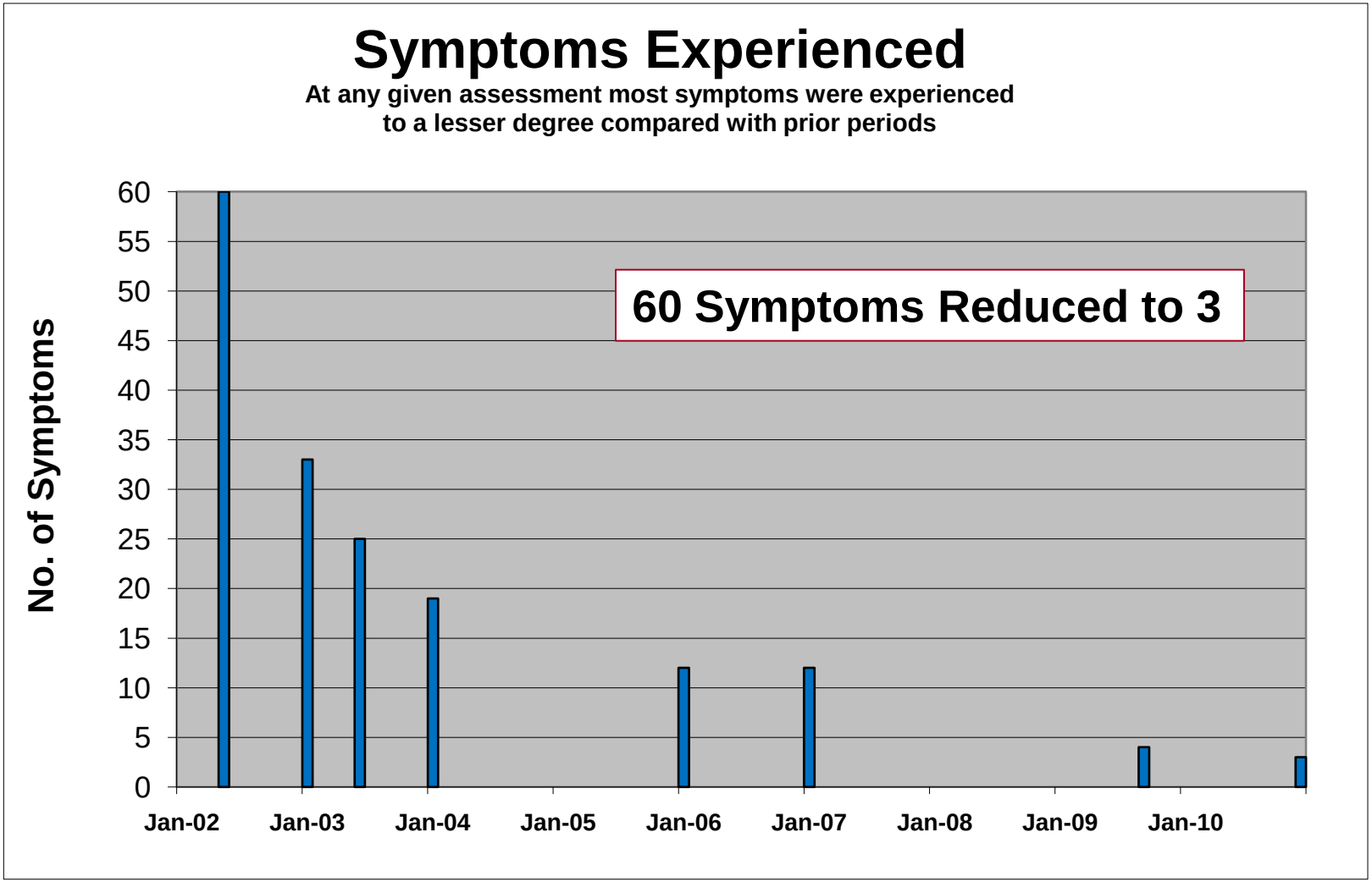
- **Kept Health Journal to Document Symptoms and Treatment Response**
  - Tracked 25 symptoms daily, sleep patterns, mood & activities
  - Tracked ~60 symptoms periodically (over several months or years)

- **Replaced Eight Amalgams with Mercury Free Materials by Mercury Free Dentist**
  - Two teeth (one quadrant) at a time spaced about three or four weeks apart
  - Protocols supported by International Academy of Oral Medicine & Toxicology (IAOMT)

- **Chelation Therapy (to remove mercury from the body)**
  - Frequent Dose Oral Chelation Protocol developed by Andrew Hall Cutler, PhD, PE
  - Alpha Lipoic Acid & later Alpha Lipoic Acid with Dimercaptosuccinic Acid (*DMSA*)

Relied heavily on *Amalgam Illness: Diagnosis and Treatment,* Andrew Hall Cutler, PhD, PE

Symptom Reduction Following Amalgam Removal & Treatment Based on Periodic Self-Assessment



After several years most symptoms are gone

2010 Self Assessment of Symptoms

- **Most Symptoms Eliminated Including**
  - seasonal allergies
  - sciatica
  - muscle weakness
  - joint pain
  - dizziness
  - fatigue
  - abdominal cramps
  - angina
  - persistent cough
  - tremors
  - night sweats

- **Emotional symptoms highly diminished (essentially gone)**
  - outbursts of temper
  - resentment of criticism
  - loss of self-confidence
  - timidity, fearfulness

- **Three Remaining Symptoms**
  - blurred vision
  - swollen lymph node in neck
  - numbness, tingling or pain in one toe (likely caused by a back injury)

Currently, 2010, several months can pass without taking nutritional supplements without symptoms returning

Returned to Full Time Employment in 2003

Is my experience unique?

2010 Review from the American Dental Association (ADA)

LITERATURE REVIEW: DENTAL AMALGAM FILLINGS AND HEALTH EFFECTS

ADA Council on Scientific Affairs, Amalgam Safety Update

September 2010

http://www.ada.org/sections/professionalResources/pdfs/amalgam_literature_review_1009.pdf

Follow up to a review by the Life Science Research Office (LSRO) published in 2004 to address eight important research gaps. *"The Panel also noted the existence of several research gaps that, if filled, may definitively support or refute the hypothesis that dental amalgam adversely affects health."*

"Studies were limited to human evaluations, because adverse health effects in laboratory animals do not reliably predict adverse health effects in humans."

Review considered 823 articles (published from 2004 to 2010) and found 66 to be relevant.

What were the research gaps considered by the ADA review?
&
What does the ADA review say about amalgam removal and the effect on symptoms associated with mercury toxicity?

Research gaps addressed by the 2010 ADA Review

- A. Neurotoxic and/or neuropsychological effects
- B. Co-exposure to organic and elemental mercury.
- C. In utero effects of low-level elemental mercury exposure.
- D. Effects on reproduction and pregnancy outcomes.
- E. Amount of mercury absorbed from breast milk and the effect on the developing brain.
- F. Kidney disease, emotional instability, erethrism, pulmonary dysfunction or other characteristics of occupational mercury exposure in dental professionals.
- **G. Studies evaluating any genetic basis for sensitivity to mercury exposure.**
- H. Gender differences in the pharmacokinetics and toxicity of mercury.

Given the 2004 research gaps, why was dental amalgam considered safe?

Several studies (related to item G) considered the effect of amalgam removal on symptoms associated with mercury toxicity

Dental removal study on those described as mercury-allergic with autoimmunity

The beneficial effect of amalgam replacement on health in patients with autoimmunity

Prochazkova J, Sterzl I, Kucerova H, Bartova J, Stejskal VD. Neuro Endocrinol Lett. 2004 Jun;25(3):211-8.

http://www.ncbi.nlm.nih.gov/pubmed/15349088

"This study evaluated thirty-five patients described as mercury-allergic with autoimmunity that had their amalgam fillings replaced with composite fillings and ceramic materials. The authors evaluated self-reported health status and lymphocyte reactivity. The authors reported that 71% of patients experienced health improvements and that the patients who improved were the ones with the highest lymphocyte reactivity before amalgam removal. The conclusion was that mercury-containing amalgam may be an important risk factor for patients with autoimmune diseases and that lymphocyte reactivity is a valuable tool for selection of patients for amalgam replacement. The study did not include a control group."

Summary from **ADA Council on Scientific Affairs Amalgam Safety Update**, September 2010, pp 11-12

Removal of amalgam resulted in health improvements

7-year Prospective Dental Removal Study

A 7-year prospective quasi-experimental study of the effects of removing dental amalgam in 76 self-referred patients compared with 146 controls

Nerdrum P, Malt UF, Høglend P, Oppedal B, Gundersen R, Holte M, Löne J. J Psychosom Res. 2004 Jul;57(1):103-11.

http://www.ncbi.nlm.nih.gov/pubmed/15256302

"This quasi experimental study evaluated changes in mental and physical symptoms in 76 patients who had their dental amalgam removed 7 years prior to the evaluation. These individuals were compared with patients with known chronic medical disorders seen in alternative (n=51) and ordinary (n=51) medical family practices and non symptomatic patients with dental amalgam fillings (control group, n=44). Removal of amalgam reduced the reported physical and mental symptoms to the level of the group with known chronic medical disorders. The control group consistently reported fewer symptoms. The authors concluded that their findings did not support the hypothesis that removal of amalgam will reduce health complaints to normal levels."

Summary from **ADA Council on Scientific Affairs Amalgam Safety Update**, September 2010, p 13

Removal of amalgam resulted in reduced symptoms but not to normal levels

Changes in Symptoms After Replacement of Dental Materials

A follow-up study of patients with subjective symptoms related to dental materials

Lygre GB, Gjerdet NR, Björkman L. Community Dent Oral Epidemiol. 2005 Jun;33(3):227-34.

http://www.ncbi.nlm.nih.gov/pubmed/15853846

"This study evaluated changes in the intensity of subjective symptoms after replacement of dental materials in patients referred to the Dental Biomaterials Adverse Reaction Unit in Norway for adverse reactions to dental materials. Of 142 patients, follow-up questionnaires were completed by 84 patients (3 were not included because the questionnaire was incomplete) and compared to 442 individuals in the general population (control group). Patients who had replaced dental materials (n=35) continued to report higher symptom indices than individuals in the control group. Patients who had not replaced dental materials (n=46) did not report any reduction in intensity of symptom indices. The authors concluded that the intensity of local (in the mouth) and some general subjective symptoms was reduced after dental materials were replaced, but not to the level reported by the general population."

Summary from **ADA Council on Scientific Affairs Amalgam Safety Update**, September 2010, pp 13-14

Removal of amalgam resulted in reduced symptoms but not to normal levels

Changes in Symptoms Following Amalgam Removal & Chelation Therapy

Mercury toxicity presenting as chronic fatigue, memory impairment and depression: diagnosis, treatment, susceptibility, and outcomes in a New Zealand general practice setting (1994-2006)

Wojcik DP, Godfrey ME, Christie D, Haley BE. Neuro Endocrinol Lett. 2006 Aug;27(4):415-23.

http://www.ncbi.nlm.nih.gov/pubmed/16891999

"This study describes a group of 465 patients who were given a diagnosis of chronic mercury toxicity (CMT) based on chronic physical and mental symptoms that were previously undiagnosed. The investigators found a correlation between CMT and the Apo-lipoprotein E4 genotype, which they suggest identifies a significant risk for developing Alzheimer's disease in these individuals. The individuals diagnosed with CMT had their amalgams removed and underwent chelation therapy. The authors reported that treated individuals had significant reductions in symptoms to the level reported by healthy individuals. The study design did not include randomization or blinding."

Summary from **ADA Council on Scientific Affairs Amalgam Safety Update**, September 2010, p 13

Amalgam removal and chelation therapy reduced symptoms to healthy levels

Changes in Symptoms Following Amalgam Removal & Antioxidant Therapy (*predates ADA review period*)

Removal of dental amalgam and other metal alloys supported by antioxidant therapy alleviates symptoms and improves quality of life in patients with amalgam-associated ill health

Lindh U, Hudecek R, Danersund A, Eriksson S, Lindvall A. Neuro Endocrinol Lett. 2002 Oct-Dec;23(5-6):459-82.

http://www.ncbi.nlm.nih.gov/pubmed/12500173

- OBJECTIVES: The purpose of this study was to evaluate treatment of patients suffering from chronic ill health with a multitude of symptoms associated with metal exposure from dental amalgam and other metal alloys.
- SETTING AND DESIGN: We included 796 patients in a retrospective study using a questionnaire about symptom changes, changes in quality of life as a consequence of treatment and assessment of care taking.
- METHODS: Treatment of the patients by removal of offending dental metals and concomitant antioxidant therapy was implemented according to the Uppsala model based on a close co-operation between physicians and dentists.
- RESULTS: More than 70% of the responders, remaining after exclusion of those who had not begun or completed removal, reported substantial recovery and increased quality of life. Comparison with similar studies showed accordance of the main results. Plasma concentrations of mercury before and after treatment supported the metal exposure to be causative for the ill health.
- MAIN FINDINGS: Treatment according to the Uppsala model proved to be adequate for more than 70% of the patients. Patients with a high probability to respond successfully to current therapy might be detected by symptom profiles before treatment.
- CONCLUSIONS: The hypothesis that metal exposure from dental amalgam can cause ill health in a susceptible part of the exposed population was supported. Further research is warranted to develop laboratory tests to support identification of the group of patients responding to current therapy as well as to find out causes of problems in the group with no or negative results.

Amalgam removal and antioxidant therapy resulted in substantial recovery

Summary

- My anecdotal experience shows reduction in symptoms following treatment for chronic mercury poisoning including amalgam removal, antioxidant/supplement therapy & chelation therapy
- Reduction in symptoms documented by periodic self-assessment conducted over several months and years
- Treatment for amalgam related mercury illness was followed by significant improvement in quality of life & return to full-time employment
- Literature, including works considered relevant by the American Dental Association Council on Scientific Affairs, shows reduction in symptoms following amalgam removal to be common & reproducible

Amalgam related chronic mercury toxicity is real & documented

Conclusion

"For medical reasons, amalgam should be eliminated in dental care as soon as possible. This will confer gains in three respects. The prevalence of side-effects from patients' mercury exposure will decline; occupational exposure to mercury can cease in dental care; and one of our largest sources of mercury in the environment can be eliminated. –Maths Berlin"

Mercury in dental-filling materials

— an updated risk analysis in environmental medical terms

An overview of scientific literature published in 1997–2002 and current knowledge

Maths Berlin, The Dental Material Commission — Care and Consideration

Stockholm, Sweden, 2002 (included as an annex in a final report submitted 3 June 2003, SOU 2003:53)

http://www.sweden.gov.se/content/1/c6/01/76/11/fb660706.pdf

Maths Berlin is a Professor Emeritus of Environmental Medicine with long experience investigating the effects of mercury on animals and humans. He chaired a 1991 World Health Organization Task Group on Environmental Health Criteria for Inorganic Mercury and prepared the report cited above as part of a special investigation for the Swedish Government on amalgam related health issues. **For the 2002 report, over 700 references published from 1997 to 2002 were read and assessed as a follow up to a similar assessment made in 1997**.

Given my understanding and experience, I agree with Maths Berlin

An Informed Consumers Assessment

For the benefit of our health and the environment, my family supports mercury free dentistry!