HEART DISEASE AND MERCURY!
A recently published study [see abstract in SCIENCE section] found tremendously elevated levels of mercury in a particular heart condition. The study was conducted by Frustaci and colleagues from the Department of Cardiology, Catholic University in Rome, Italy and was published in the Journal of the American College of Cardiology. The authors were specifically interested in “Idiopathic Dilated Cardiomyopathy (IDCM),” based on the fact that both myocardial trace element accumulation and deficiency have been associated with the development of heart failure indistinguishable from an idiopathic dilated cardiomyopathy. They biopsied tissues, utilized neutron activation analysis, and compared the levels of Trace Elements (TE) in victims of IDCM, patients with secondary cardiac dysfunction, and controls.

In patients with IDCM, the mean mercury concentration was 22,000 times the levels in controls (178,000 nanograms/gram vs. 8 nanograms/gram). The mercury level was 30 nanograms/gram in patients with valvular heart disease, and 23 nanograms/gram in patients with ischemic heart disease. The authors stated that it was “unlikely that there would be no adverse effect” from the mercury accumulation, which pointed to myocardial cell degeneration and dysfunction.

IDCM is a condition of dilation of the heart ventricles, disturbance of the contraction of the heart and, often, congestive heart failure. It is believed to be an expression of myocardial damage caused by a variety of factors, although specific causes are ill-defined (hence, “Idiopathic”). Interestingly, athletes sometimes succumb to IDCM, which is puzzling considering the excellent physical condition of most athletes. One might question how such a very large accumulation of mercury can be explained. Even a cursory examination of
published dental literature reveals a possible answer. Published studies have revealed that an enormous amount of mercury can be generated during the grinding of amalgam fillings (i.e., the removal of mercury fillings, adjusting the bite of existing amalgam fillings, or polishing the teeth with amalgams present), especially if great care is not taken to reduce the volume generated.

The identification of these heavy metal concentrations in the heart tissue, especially mercury, is revealing. Mercury has long been proven to rapidly pass into heart tissue and to cause cardiovascular damage.

In 1991, Bio-Probe produced a book entitled "The Missing Link: A Persuasive New Look at Heart Disease As It Relates To Mercury" [Available at $12.00 US + $3.00 S/H]. This book describes the role of mercury in causing cardiovascular disease - including, hypertension, damage to the inner lining of blood vessels, elevated blood cholesterol, constriction of the coronary arteries of the heart, disturbances in the electrical function of the heart, and even myocardial infarctions (heart attacks). The book also points out that, in spite of widespread public awareness of the risk factors for heart disease and the success of the medical profession in the treatment of the disease, the occurrence of heart disease continues to increase (at least up to the time that the book was written!)

In view of this unfortunate circumstance, and the tremendous amount of published research implicating mercury in cardiovascular disease, the book proposes that exposure to mercury (particularly from mercury amalgam dental fillings) is the "Missing Link" in risk factors leading to cardiovascular disease. Space in this article does not permit referencing the numerous published studies, but they are all abstracted in the book.

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BIOLOGICAL DENTIST ON DENTAL BOARD!

A milestone has been reached! Governor Jesse Ventura of Minnesota has just appointed Ronald L. King, DDS to the State Board of Dentistry. He was not the candidate endorsed by the Minnesota Dental Association, so the Governor’s decision was unexpected.

Dr. King, who is a long time member of the International Academy of Oral Medicine and Toxicology (IAOMT) and the Holistic Dental Association, will at least be a voice for biological dentistry on the Board. Rather than confrontation on specific issues, his goals are to be an advocate for free choice when combined with adequate informed consent. He also hopes to be a voice of reason and a bridge builder between differing factions of dentistry. With help from everybody, he may even be able to get the valid scientific documentation on controversial issues on record with the Board.

Congratulations Dr. King (and "Thank You" Governor Ventura)!

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OXFORD DEBATE ON AMALGAM

On 27 May 1999, the Post-Graduate School of Medicine and Dentistry of the University of Oxford in England sponsored a debate on the mercury amalgam controversy. The program began with background information on dental amalgam by Dr. David Brown. Next, Fritz L. Lorscheider, Ph. D., of the Medical Faculty of the University of Calgary in Canada, spoke on the science documenting a potential hazard to amalgam mercury. He was followed by Professor B. M. Eley, of the Periodontal Department of King’s College in London, speaking for the safety of amalgam derived mercury.

A spirited debate and discussion followed, first addressing four questions presented by the sponsors: 1) Does dental amalgam consist of approximately 50% mercury? [All were in
unanimous agreement that it does.] 2) Is mercury released throughout the lifetime of amalgam fillings? [All were in unanimous agreement that it does.] 3) Does dental amalgam provide a significant contribution of mercury to the body burden in patients? [There was non-unanimous concurrence that it does. Dr. Lorscheider and most of the audience agreed. Dr. Eley maintained that he was not convinced that it does.] 4) How should dentistry approach the question of the significance of this mercury exposure on human health? [Dr. Lorscheider argued that it should be addressed seriously, while Dr. Eley felt that it may not be necessary.]

The debate was very well attended. In fact, it was necessary to re-schedule it to a larger room. Of the roughly 270 attendees, about 90% were dentists, with the remainder being medical and dental academics. BBC radio provided extensive coverage through interviews. Bio-Probe recently had a conversation with a British dentist who attended the debate. We were told that Dr. Lorscheider, who presented the 1999 Rayne Memorial Lecture, thoroughly convinced a room full of dentists that patient exposure to amalgam mercury indeed presented a potential health risk.

It is indeed significant that an academic debate on mercury exposure from dental amalgam was held at what is arguably England’s most prestigious university. This portends a reconsideration of this issue by some leaders within the dental profession.

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MONTREAL TO LEGISLATE DENTAL MERCURY RECYCLING

[Bio-Probe thanks Dr. Pierre Larose for providing this translation. The following article excerpts appeared in La Presse, Montreal’s largest French language morning newspaper, on 31 May 1999.]

“Montreal Water Treatment Plant Polluting the

St. Lawrence River With Mercury.” by Eric Trottier.

Has the Montreal water treatment plant become the most important mercury pollutant in Quebec? Unable to treat all of its toxic waste, the Riviere-des-Prairies plant leaches out between 200 and 300 kilograms of mercury per year in the atmosphere and in the St. Lawrence River.

The problem is so important that the Environmental Services of the Montreal Urban Community must initiate an information campaign on the dangers of mercury and, is considering modifying Rule 87 on industrial wastes to force dentists, responsible for 27% of the mercury in the effluents, to install mercury recycling systems in their offices.

According to documents obtained by La Presse, half of the mercury seeps through the station filters to end up in the river. The other half is recuperated to be incinerated with other semi-solid waste, and finally rejected into the atmosphere. This mercury can then travel over great distances and contaminate lakes and waterbeds up to 1000 kilometers away.

Mercury, we must recall, is a very toxic substance known to accumulate in the food chain, most notably in fish. A mercury intoxicated person risks various problems in the brain, the nervous system and the kidneys. “Damage can be particularly important in pregnant women and the developing foetus” reports the document obtained from the Montreal Urban Community web site.

The international community wishes to ban this heavy metal used by industries, dentists, hospitals, and at home (thermometers, etc.). Dentists who use mercury in the alloy to fill teeth will particularly be targeted since they are responsible for 27% of the mercury dumped in the sewage system. An information campaign has begun amongst dentists to encourage them to recuperate residual mercury from amalgam
fillings. But if the dentists fail to comply, the superintendent of the Environmental Service says he would simply amend Rule 87 to force dentists to recycle their used mercury.

Sources of Mercury at the Montreal Plant:
Dental clinics= 27%, Domestic water= 10%, Rain water= 27%, Other= 34%, Septic tanks= 2%.

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MASSACHUSETTS ACTS ON DENTAL MERCURY
[MWRA News Release, 27 April 1998]
The Massachusetts Water Resources Authority (MWRA) Department of Toxic Reduction and Control (TRAC) confirmed that area dental offices continue to be a significant source of mercury discharges into the sewer system. The findings stem from a 1997 study by TRAC, with working cooperation from the Massachusetts Dental Society and the American Dental Association.

At a meeting of the Yankee Dental Conference in January of 1998, MRWA presented its findings to over 200 attending dentists, and gave recommendations for reducing mercury releases into the sewer system. TRAC developed a brochure outlining voluntary practices to significantly reduce mercury input.

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PORTLAND ADDRESSES DENTAL WASTES
The Bureau of Environmental Services (BES) of Portland, Oregon is addressing dental offices as an increasing source of hazardous debris, with the focus being on mercury. Mercury and silver, from X-ray developing processes, gets washed down drains. Amalgam scrap and other dental materials, such as lead sheaths from X-ray films, are disposed of in the trash.

Dental authorities claim that mercury is bound into the amalgam fillings and pose no threat to human health. Government officials, however, maintain that when mercury fillings are made or removed, dust and chunks of the material are often washed down drains. In the environment, mercury collects in the food chain and can pose health problems if ingested. Existing traps and filters catch only the larger chunks of amalgam, allowing about half of the mercury through.

The Oregon Dental Association (ODA) is signing a voluntary agreement with Portland’s BES to encourage more recycling from dental offices. The goal of the agreement is to achieve 90% compliance from dental offices within five years. The ODA has promoted their “Best Management Practices” to the 2,200 active dentists in the state. The BES and the ODA hope that government regulation and policing can be avoided.

Almost ten years ago, Seattle addressed the problem. The dental association successfully fought government regulations requiring mercury amalgam collection systems in all dental offices. A voluntary agreement has resulted in only about 1% of the Seattle dental offices voluntarily installing the collection system.

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SCIENCE
Marked Elevation of Myocardial Trace Elements in Idiopathic Dilated Cardiomyopathy Compared With Secondary Cardiac Dysfunction.
Frustaci, A; Magnavita, N; Chimenti, C; Caldarulo, M; Sabbicini, E; Pietra, R; Cellini, C; Possati, GF; Maseri, A.

ABSTRACT: Objectives: We sought to investigate the possible pathogenetic role of myocardial trace elements (TE) in patients with various forms of cardiac failure. Background: Both myocardial TE accumulation and deficiency have been associated with the development of heart failure indistinguishable from an idiopathic dilated cardiomyopathy.
Methods: Myocardial and muscular content of 32 TE has been assessed in biopsy samples of 13 patients (pts) with clinical, hemodynamic and histologic diagnosis of idiopathic dilated cardiomyopathy (IDCM), all without past or current exposure to TE. One muscular and one left ventricular (LV) endomyocardial specimen from each patient, drawn with metal contamination-free technique, were analyzed by neutron activation analysis and compared with 1) similar surgical samples from patients with valvular (12 pts) and ischemic (13 pts) heart disease comparable for age and degree of LV dysfunction; 2) papillary and skeletal muscle surgical biopsies from 10 pts with mitral stenosis and normal LV function, and 3) LV endomyocardial biopsies from four normal subjects.

Results: A large increase (>10,000 times for mercury and antimony) of TE concentration has been observed in myocardial but not in muscular samples in all pts with IDCM. Patients with secondary cardiac dysfunction had mild increase (⩽ 5 times) of myocardial TE and normal muscular TE. In particular, in pts with IDCM mean mercury concentration was 22,000 times (178,400 ng/g vs. 8 ng/g), antimony 12,000 times (19,260 ng/g vs. 1.5 ng/g), gold 11 times (26 ng/g vs. 2.3 ng/g), chromium 13 times (2,300 ng/g vs. 177 ng/g) and cobalt 4 times (86.5 ng/g vs. 20 ng/g) higher than in control subjects.

Conclusions: A large, significant increase of myocardial TE is present in IDCM but not in secondary cardiac dysfunction. The increased concentration of TE in pts with IDCM may adversely affect mitochondrial activity and myocardial metabolism and worsen cellular function.

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Public Health Goal For Inorganic Mercury in Drinking Water.
California Public Health Goal (PHG), February 1999

California Environmental Protection Agency
Office of Environmental Health Hazard Assessment
Pesticide and Environmental Toxicology Section
1515 Clay Street, 16th Floor
Oakland, CA. 94612

SUMMARY: A Public Health Goal (PHG) of 0.0012 mg/L (1 part per billion) has been developed for inorganic mercury compounds in drinking water. There are a variety of effects from exposure of humans and animals to mercury-containing compounds. For inorganic mercury compounds, the predominant effect is toxicity to the kidney. Inadequate information exists on the chronic effects of inorganic mercury in either animals or humans. Therefore, individual health-based concentrations were computed based on slight kidney toxicity in a short-term study.

In this study, rats were administered 0, 0.23, 0.46, 0.92, 1.8 or 3.7 mg Hg/kg-day by gavage for six months. The decrease in body weight gains and increases in absolute and relative kidney weights at doses of 0.46 mg Hg/kg-day and above were sufficient to designate the dose of 0.46 mg Hg/kg-day as the LOAEL. Therefore, the dose of 0.23 mg Hg/kg-day would be a NOAEL.

Using the subchronic study, a health-based concentration was computed based on an adult body weight of 70 kg, a consumption of 2L of water per day, an inter- and intraspecies uncertainty factor of 100, a source contribution factor of 20% and an additional uncertainty factor of 10 to extrapolate chronic effects from subchronic observations. Based on these considerations, the Office of Environmental Health Hazard Assessment (OEHHA) adopts a PHG of 0.0012 mg/L (1.2 ppb) for inorganic mercury in drinking water.

INTRODUCTION: The purpose of this document is to develop a PHG for inorganic...
mercury. At present, mercury and mercury compounds can be categorized into three groups: mercury (metallic or elemental), inorganic and organic mercury compounds. Based on the chemical, biological and environmental fate characteristics of all these forms, inorganic mercury is the form most likely to pose a hazard by drinking water. For that reason, federal and state drinking water regulations for mercury in drinking water have been based on the hazards of inorganic mercury. A Maximum Contaminant Level (MCL) of 0.002 mg/L was established by the California Department of Health Services (DHS) in 1995 (22 CCR 64431). This level is the same as the federal Maximum Contaminant Level Goal (MCLG) and MCL of 0.002 mg/L for mercury (U.S. EPA, 1997a).

Inorganic mercury has been evaluated for carcinogenic potential. Mercuric chloride has been classified by the U.S. Environmental Protection Agency (U.S. EPA) as a possible human carcinogen, Group C (IRIS, 1998). In this document, we focus on evaluation the available data on the toxicity of inorganic mercury. To determine a public health-protective level of inorganic mercury in drinking water, sensitive groups were identified and considered, and relevant studies were identified, reviewed and evaluated.

**Bio-Probe Comment:** Although the major focus on the potential hazards of mercury from amalgam dental fillings has been on the release of elemental mercury vapor, the issue of amalgam-derived inorganic mercury compounds (i.e., mercuric chloride, etc.) is also important. The earlier articles in this issue (Montreal, Massachusetts, Oregon) indicate a significant role of dentistry in increasing levels of mercury in environmental water.

In addition, studies have demonstrated the presence of very high levels of mercury in the saliva of humans with amalgam dental fillings. A high percentage of this mercury is likely to be in the form of inorganic mercury compounds. Subjects with amalgam fillings could very well be swallowing levels of inorganic mercury compounds during the course of a day that exceed the standard set by California, or even that of the U.S. EPA.

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**In Vitro Study of Components Released From Fissure Sealants and Their Estrogenicity.** Matsuzawa, M; Kawata, A; Kurata, S; Uchimura, N; Kawase, T.
ABSTRACT: A recent study on the estrogenicity of resin based dental composites and sealants has raised controversy and concern about the safety of monomers leached out of these materials. The study reported that an estrogenic chemical, bisphenol-A (BPA) was released from a fissure sealant (Olea et al., Environmental Health Perspectives, 104:295, 1996).

The aim of this study is to identify and quantify BPA and other components released from three light cured fissure sealants (Tokuyama, Palfix Clear; Degussa, Deguseal Mineral; 3M, Concise), and to clarify the effect of each monomer on cell growth of Human Periodontal Ligament Fibroblasts (HPLF) and human breast cancer cells (MCF-7) in vitro. Teflon ring mold (diameter: 5.0 mm, thickness: 1.0 mm) were filled with sealants which were light activated and immersed in 1.5 ml tube with each solvents (EtOH, artificial saliva) for 2, 4, 6 and 8 days at 37 degrees C. Each polymerized sealants were removed and each remaining solvents analyzed by HPLC. Major peaks corresponding in elution time to the known components TEGDMA and Bis-GMA was detected in all eluted with EtOH, but only TEGDMA in eluted with artificial saliva. The content of TEGDMA eluted with EtOH was about fifteen fold of that eluted with artificial saliva. No peak
corresponding to BPA was present in any eluate.
HPLF and MCF-7 were inoculated in 96 well multi-well plate at 2 x 10(4) cells/cm(2) and cultured for 7 days. Bis-GMA and TEGDMA (10pM ~ 1 microM) were added and cultured for 6 days comparing with 17 Beta-estradiol (E2; 1pM ~ 1microM), DES and BPA (10pM ~ 10 microM). The cell growth of HPLF was not affected by these chemicals. The proliferative effect of E2 and DES was observed at the concentration of 1pM to 100 nM and 10pM to 1 microM, respectively. BPA was positive at 100 nM and 1 microM. However, Bis-GMA and TEGDMA were negative in the proliferative test of MCF-7.

Therefore, since our study could not detect BPA in the elute from any of these sealants tested, further studies may be needed to assess the biological effects of the other leached components detected.

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Absence of Bisphenol A (BPA) in ADA Seal of Acceptance Pit and Fissure Sealants.
Miaw, CL; Chou, H; Gruninger, SE; Siew, C; Geary, R; Jose, S; Wozniak, WT; Fan, PL.
ABSTRACT: Concerns have been expressed about whether Bisphenol A (BPA), a potential estrogenic chemical, is present in dental pit and fissure sealants as a contaminant. This study was to determine if BPA is present in pit and fissure sealants that are currently in the ADA Acceptance Program. Sealant products tested were: Alphadent clear chemical cure, Alphadent clear light cure, Alphadent opaque chemical cure, Alphadent opaque light cure, Baritone L3, Concise, Helioseal F, Helioseal Type II, Prisma Shield VLC Filled, Prisma Shield Compules Tip, Seal-Rite, and Seal-Rite low viscosity F.
Sample disks (10 mm diameter, 2 mm thick) were prepared. Chemical cure sealants were mixed according to manufacturers' instructions.

A Visilux 2 light was used (for 50 s per surface) to polymerize the light-cure sealant samples. Each polymerized sample was placed in 5 ml of saline and sonicated for 20 s. Eluted samples were withdrawn immediately after sonification and after 24 h storage at 37 degrees C. High pressure liquid chromatography (HPLC) with a fluorescence detector (at excitation wavelength 278 nm and emission wavelength 315 nm) was used to quantitate the amount of BPA. In calibration using GPA, the retention time of BPA is 5.8 min eluted with 50% acetonitrile water at a flow rate of 1.0 mL/min. The detectable limit of BPA when using this method is 5 ppb (5 ng/ml) with 30 microl injection.
BPA was not detected in any in vitro eluted samples of the pit and fissure sealants that presently have the ADA Seal of Acceptance.

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Influence of Prenatal Mercury Exposure Upon Scholastic Test Performance: Benchmark Analysis of a New Zealand Cohort.
Crump, KS; Kjellstrom, T; Shipp, AM; Silvers, A; Stewart, A.
ABSTRACT: This paper presents benchmark (BMD) calculations and additional regression analyses of data from a study in which scores from 26 scholastic and psychological tests administered to 237 6- and 7-year old New Zealand children were correlated with the mercury concentration in their mothers' hair during pregnancy.
The original analyses of five test scores found an association between high prenatal mercury exposure and decreased test performance, using category variables for mercury exposure. Our regression analysis, which utilized the actual hair mercury level, did not find significant associations between mercury and children's test scores. However, this finding was highly influenced by a single child whose mother's
mercury hair level (86 mg/kg) was more than four times that of any other mother. When that child was omitted, results were more indicative of a mercury effect and scores on six tests were significantly associated with the mothers’ hair mercury level.

BMDs calculated from five tests ranged from 32 to 73 mg/kg hair mercury, and corresponding BMDLs (95% lower limits on BMDs) ranged from 17 to 24 mg/kg. When the child with the highest mercury level was omitted, BMDs ranged from 13 to 21 mg/kg, and corresponding BMDLs ranged from 7.4 to 10 mg/kg.

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FORUM

IAOMT 1999 ANNUAL MEETING
DATE: Friday-Saturday, 8-9 October 1999.
SITE: Atlanta, Georgia.
HOTEL: Hotel W (formerly Sheraton Perimeter Center Hotel and Suites Atlanta), 111 Perimeter Center West, Atlanta, GA 30346. T: (770) 396-6800, (800) 683-6100; F: (770) 394-5514.
Specify IAOMT room rate: $109.00/night; or suite: $119.00/night.
MEETING REGISTRATION: IAOMT, P.O. Box 608531, Orlando, FL 32860-8531. T: (407) 298-2450; F: (407) 298-3075. IAOMT members: $475.00 U.S.; Non-members: $575.00 U.S. [Includes spouse or one staff member, Friday and Saturday lunches for both, and Saturday evening Annual Awards Banquet for both. Additional auxiliary: $100.00 each [includes two lunches and banquet]. [Meals included only if registered by 10/05/1999]
MEETING HOST: Dr. Ronald Dressler.
WELCOME NO-HOST RECEPTION: Thursday, 7 October 1999, 7:30pm.
PROGRAM: Friday morning Clinical Theme: Cavitations: Stephen R. Evans, DDS and Karen J. Evans, EdD.
Friday Afternoon Speakers:
Dr. Agnes Koubi: “Clinical Determination of Dental Foci in the Medically Compromised Patient.”
Elaine Reedy, PhD: “Blood Chemistry Analysis.”

James E. Hardy, DMD: “Bio-Electromagnetism and Dental Metals.”
Saturday Speakers:
Gerald Hirsch, PhD: “Methionine - The Missing Antioxidant.”
Anne O. Summers, PhD: “Amalgam Mercury, Gut Bacteria & Antibiotic Resistance.”
J. Curt Pendergrass, PhD: “Gingival Crevicular Fluid Components and Analysis.”
Charles R. Cornett, PhD: “Interregional Brain Mercury Distribution and Alzheimer’s Disease.”
1999 ANNUAL AWARDS BANQUET: Saturday, 9 October, 7:00pm.

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American Academy of Head, Neck & Facial Pain
Orofacial Pain and TMD
SITE: Houston, Texas.
MEETING REGISTRATION: AAHNFP Central Office, 520 West Pipeline Road, Hurst, TX 76053. T: 817-282-1501 or 800-322-8651; F: 817-282-8012. Members: $635; non-members: $735 ($50 additional if after 15 July).

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National Dental Seminar in Homeopathy
DATE: 15-17 October 1999.
SITE: Schaumburg (Chicago), Illinois.
HOTEL: AmeriSuites Hotel. 1851 McConner Parkway, Schaumburg, IL 60173. T: (847) 330-1060; F: (847) 330-1001. $79.00/night.
MEETING REGISTRATION: National Dental Seminar. P.O. Box 123, Marengo, IL 60152-0123. T: (815) 568-5222; F: (815) 568-7422. Basic Course (before 1 Sept): $495 ($395); Advanced Course: $475 ($375); add. spouse/auxiliary: $225 ($150).
FACULTY: Craig A. Zunka, DDS; Phil Parsons, DDS; Daniel Dieska, DDS; Jack Belitz, DDS; Judith Belitz, DDS; Harris Kimbrough, DDS.

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