Mercury Toxicity and Lichen Planus

Clinical Protocol

Oral Lichen Planus and other oral lesions including squamous cell cancer: The Primary Cause is Immune Reactivity to Amalgam Fillings

- Mercury is one of the most toxic substances in existence and is known to bioaccumulate in the body of people and animals that have chronic exposure (35).
- Mercury from occupational exposure and dental fillings is primarily from elemental mercury vapor.
- Mercury vapor is highly absorbed by the lungs and in saliva or blood is rapidly converted to ionic or methyl mercury.
- Mouth bacteria and yeast as well as other methyl donors convert other forms of mercury to methyl mercury, so that most mercury in the blood is methyl mercury regardless of source (9, 42).
- Mercury in amalgam fillings, because of its high volatility and galvanic action due to presence of dissimilar metals in the mouth, has been found to be continuously vaporized and also released into the body through galvanic currents (29, 43, etc.), and has been found to be the largest source of mercury in the majority of people WHO (27), 9, 30, 32, 42, 1, 14).
- The level of daily exposure commonly exceeds the U.S. EPA health guideline for daily mercury exposure (35, 42).
- Mercury vapor given off by amalgam fillings accumulates in the teeth, tooth roots, gums, jawbone, and oral tissue. The number of amalgam surfaces has a statistically significant correlation to the level of mercury in oral mucosa and saliva (1, 12, 13, 26, 30, 33, 36, and 42).
- High levels of mercury have been documented to accumulate in the gums, jawbone, and oral mucosa of those with amalgam fillings and to be transferred to the blood stream and other parts of the body (43).
- Concentrations of mercury in oral mucosa for a population of patients with 6 or more amalgam fillings taken during oral surgery were 20 times the level of controls (25).
- Studies have shown mercury travels from amalgam into dentin, root tips, and the gums, with levels in roots tips as high as 41 parts per million (ppm) (25).
- Studies have shown that mercury in the gums, such as from root caps for root canalled teeth or amalgam tattoos, result in chronic inflammation and proliferation of inflammatory ci, in addition to migration to other parts of the body (31, 7, 6, 43, and 151).
- Mercury, silver, and other metals from fillings can be seen in the tissues as amalgam “tattoos”, which have been found to accumulate in the oral mucosa as granules along collagen bundles, blood vessels, nerve sheaths, elastic fibers, membranes, striated muscle fibers, and acini of minor salivary glands. Dark granules are also present intracellularly within macrophages, multinucleated giant cells, endothelial cells, and fibroblasts, and metals also accumulate in tooth roots and the jaw bone (7, 6).

- There is, in most cases, chronic inflammatory response or macrophagic reaction to the metals (7, 18), usually in the form of a foreign body granuloma with multinucleated giant cells of the foreign body and Langhans types (29).
- In a group of patients with amalgam tattoos that were tested, 74% of the patients revealed high lymphocyte reactivity (positive MELISA test) to one or more metal components of dental restorations(7k). The majority of MELISA positive patients suffered from serious health problems (various allergies, autoimmune diseases, Parkinson's syndrome etc.).
- Nickel and inorganic mercury were the most common sensitizers in vitro. The cytokine assay revealed that mercury chloride activated predominantly TH2 lymphocytes, while nickel chloride activated mainly TH1 lymphocytes.
- Many dentists are not aware that the main source of amalgam tattoos is “oral galvanism”, where electric currents caused by mixed metals in the mouth take the metals into the gums and oral mucosa, accumulating at the base of teeth with large fillings or metal crowns over amalgam base (29, 43). Such mercury, including that in the commonly formed amalgam tattoos, moves to other parts of the body over time in significant amounts and more rapidly than the other metals.
- Macrophages remove mercury by phagocytosis and the mercury moves to other parts of the body through the blood and along nerves (7).
- Another study (7l) demonstrated a dense mononuclear inflammatory infiltrate associated with large and powdered debris and positivity for HLA-DR and MT in inflammatory cells. While blood vessel walls and connective fibers impregnated with powdered particles were negative for HLA-DR, they were positive for MT. In addition, wherever epithelial basement membrane impregnation by powdered amalgam particles was observed, a strong positivity for MT was detected.
- These findings demonstrate that residual elements of AT still have noxious local effects over tissues. Such metals are documented to commonly cause local and systemic lesions along with other health effects, which usually recover after removal of the amalgam tattoo by surgery (7fghim). The high levels of accumulated mercury also are dispersed to other parts of the body (43).
- The amount of mercury in saliva averaged between 1.5 to 1.9 micrograms per liter for each amalgam filling (30ab), enough to cause daily exposure of 10 to 100 micrograms of mercury.
- The amount of mercury released by a gold alloy bridge over amalgam over a 10 year period was measured to be approx. 101 milligrams (mg) (60% of total) or 30 micrograms (ug) per day (1), and other studies have found similar results (26, 42).
- The average mercury levels in gum tissue near amalgam fillings are often over 100 ppm (29), and levels in oral mucosa removed during oral surgery averaged over 2 ppm (over 20 times controls) and levels in root tips of 41 ppm (25, 29, 7).
- Having dissimilar metals in the teeth (e.g. gold and mercury) causes galvanic action, electrical currents, and much higher mercury vapor levels and mercury levels in tissues. (26, 28, 29, 1, 2, 4, 5, 7, 8, 25).
- The level of mercury in the gums or jaw bone is often 1000 ppm near a gold cap on an amalgam filling (5, 3, 6, 8, 10), and similar levels as high as 5600 ppm have been found in the jaw bone under large amalgam fillings or gold crowns over amalgam by German oral surgeons (44).

- These levels are among the highest levels ever measured in tissues of living organisms, exceeding the highest levels found in chronically exposed chloral kali workers, those who died from mercury in Minamata, or animals that died from mercury poisoning.
- The FDA action level for warnings of dangerous levels in fish or food is 1 ppm and the EPA health criterion level is 0.3 ppm.
- Amalgam also releases significant amounts of silver, tin, and copper which also have toxic effects, with organic tin compounds formed in the body being even more neurotoxic than inorganic mercury.
- Toxic/allergic reactions to toxic metals such as mercury often result in autoimmune conditions, such as lichen planus lesions in oral mucosa or gums, and play a roll in pathogenesis of periodontal disease.
- Oral lichen planus has been found to be an autoimmune process in which the Immune Th1 T-cells mediate the reactivity, including Lymphotoxin-alpha (LTa), Tumor Necrosis Factor-alpha (TNFa), and Interferon-gamma (IFNa) (18, 37, 40b).
- A high percentage of patients with oral mucosal problems (37, 18), along with other autoimmune conditions such as chronic fatigue (23, 39), MS or lupus (40), have significant immune reactions to mercury, palladium, gold, and nickel (37, 23).
- **Removal of amalgam fillings usually led to cure or significant improvement for oral lichen planus (**15-17, 20-22, 24, 37, etc.), as well as **for oral keratosis** (pre-cancer) (16b, 45), and **most of other oral health problems** including metallic taste, tender teeth, mouth sores, bad breath, bleeding gums and throat irritation (43). A connection between mercury immune reactivity from amalgam and oral cancers has also been demonstrated (18, 19).
- Most cases of CFS, MS, or lupus patients also had significant immune reactions to inorganic mercury (MELISA test) and removal of amalgam fillings usually results in cure or significant improvement of such conditions (23, 39, 40, and 11).
- In one clinic (21) that replaced amalgams for a large number of such patients, there was cure or significant improvement in over 90% of cases.
- A Jerome meter was used to measure mercury vapor level in the mouth, and many had over 50 micrograms mercury per cubic meter of air, far above the Government health guideline for mercury (35).
- In a recent study of patients with OLP, 60% showed sensitization to 1 or more allergens using a patch test (17a). The greatest frequency of positive reactions was to dental metals.
- The order of tested metals, according to frequency of positive reactions, was mercury, amalgam nickel, palladium, cobalt, gold, chrome, and indium. However, patch tests have been found to not be a reliable indicator of mercury immune reactivity or allergy.
- In large number of clinical trials by doctors treating OLP, between 39 and 53% of patients tested by patch tests were indicated to be reactive to mercury (16abc, 17, and 24a). However, when patients had amalgams replaced, the majority recovered or significantly improved in a relatively short time period regardless of patch test results (15, 16abc, 17, 24, and 37). Thus, the authors recommend replacement of amalgam in all cases of OLP and similar conditions.
- The MELISA blood lymphocyte immune reactivity test appears to be a more accurate indicator of immune reactivity than the patch test (37, 39, and 40). When patch tests are to be used it should be noted that the clinical trials found that mercury immune reactivity

- is often a delayed reaction, with positive patch test observed only later on the 10th or 17th day of the test (17, and 24a).
- Patients with OLP also commonly have been found to be immune reactive to gold or nickel (17, 16d, 37, and 40) so that replacement of gold or nickel crowns may be beneficial in such patients when amalgam replacement is not sufficient to resolve the problem.
- Oral lichen planus and oral lesions, caused most commonly by reactivity to mercury, are inflammatory pre-cancerous conditions that have been well documented in the literature to often develop into oral squamous cell carcinoma (OSCC) (46, and 90a).
- Infection and chronic inflammation have been found to contribute to carcinogenesis through inflammation-related mechanisms (47 and 48). Inflammatory bowel diseases are associated with colon carcinogenesis and inflammatory oral conditions such as oral lichen planus (OLP) and leukoplakia are associated with OSCC.
- Previous studies have shown significant increases of NF-kappaB dependent cytokines, Tumor Necrosis Factor-alpha (TNF-a), IL-1alpha, IL-6, and IL-8 in different oral fluids from oral lichen planus (OLP) patients (48).
- In samples of whole, unstimulated saliva, in this study, for moderate and severe OLP dysplasia, the level of each cytokine was significantly higher than in control.
- In moderate dysplasia, TNF-alpha and IL-1alpha were significantly increased at a level without difference from OSCC, but IL-6 and IL-8 was detected at a concentration significantly lower than OSCC.
- In severe OLP dysplasia, the level of TNF-alpha was not significantly different from that of Oral Squamous Cell Carcinoma.
- The study confirmed preclinical data that NF-kappaB dependent cytokines are up-regulated in pre-malignant OLP and oral carcinogenesis.
- Cytologic and DNA-cytometric examination of oral lesions and oral lichen planus have also been found to be reliable indicators of OLP cases becoming malignant (49). Immunolabeled oncoproteins were found to b modified in the premalignant leukoplakia, oral lichen planus and in squamous cell cancer (49, and 46a).
- The evidence supports that dental amalgam is the most common cause of oral squamous cell carcinoma, similar to the fact it is the most common cause of OLP. The available pretreatment dental records of 133 patients with carcinoma of the tongue seen at the British Columbia Cancer Agency between 1958 and 1992 were reviewed. The majority had amalgam fillings on the side of the tongue involved in the carcinoma. Of the 7 patients with amalgams on only one side of the mouth, 6 cases of oral cancer had amalgams on the side of the cancer and only 1 on the side without amalgams (50).
- People with oral lichen planus often develop OLP at multiple sites (51) and also can have lichen planus in other locations such as the esophagus (52) or genitals (53).
- In one study, 41 women diagnosed with OLP underwent gynecological exam and 75.6% were found to have evidence of genital involvement, vulvar lichen planus or vulvar lichen sclerosis (53b). Such inflammatory conditions can also become cancerous (52, and 54).
- Two siblings with long standing cutaneous lichen planus of the esophagus both developed squamous cell carcinoma (52). Since immune reactivity to mercury is the most common cause of OLP and OSCC and since immune reactivity to mercury is a systemic condition (37, etc.), systemic immune reactivity to mercury might be the most likely cause of lichen planus and resulting squamous cell cancers of other organs such as the esophagus and genitals.

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