MERCURY TOXICITY FROM DENTAL CLINICS: A MINI REVIEW

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ABSTRACT

Mercury in the form of amalgam is currently used for 45% of all direct dental restorations worldwide, the so called “silver fillings.” Amalgam is an alloy of mercury (Hg) having excellent properties as a dental restorative material. Mercury is a known neurotoxin which is harmful to humans especially to fetuses, pregnant women and children. Mercury pollution of environment affects the entire ecosystem. Therefore the proper handling of mercury in the dental office is an important occupational safety issue for the dental doctors. The intent of this review is to provide the dental professional with the safety issues, the toxicological effects of mercury and preventive measures so that better strategies can be developed to manage this hazardous waste and to protect the society from toxic effects of mercury.

KEYWORDS: Mercury, Dental amalgam, Silver fillings, Toxicity

INTRODUCTION

Mercury (chemical symbol Hg) is a naturally occurring substance that is found in the earth’s crust with volcanic eruptions as the major natural source. Dental amalgam is an alloy composed of a mixture of approximately equal parts of elemental liquid mercury and an alloy powder. Millions of dental doctors throughout the world routinely use dental amalgam as a filling material in decayed teeth, commonly known as “silver fillings”. Excellent long term performance, ease of use and low cost are the main factors which contributed to its use in dentistry. All dental amalgams actually consist of 45-55% metallic mercury. Despite its above mentioned qualities, the popularity of dental amalgam as a restorative material is declining with emphasis on periodic concerns regarding the potential adverse health effects arising from exposure to mercury in amalgam.[1,2,3,4]

Entire population is exposed to mercury through exposed via air, water, and food. Exposure to mercury in human individuals with amalgam restoration occurs during the placement or removal of dental restorations. Literature do reported that all the amalgam restorations leak mercury into the oral cavity, but consistent findings are not available to report whether it has any significant health risk. Controversy is running since the use of mercury in dentistry since the 1800’s, when the hazardous/toxic material was first widely introduced as a filling component. The American Society of Dental Surgeons, the predecessor to the American Dental Association (ADA), made its members pledge not to use mercury because of its known toxicity to humans and environment. The safety issues of dental amalgam restorations has been the need and subject of discussion in previous publications, expert panel meetings, continuing dental education programmes and National and International symposiums, conventions and conferences.[1,2,3,4]

Source of Mercury Exposure from Dentistry

- Mercury vapors: exposure to mercury vapor occurs during placement and removal of amalgam fillings in dental clinics. The drilling action during removal of restoration creates amalgam dust and friction results in heat, thus releasing mercury vapor. These vapors are inhaled by both patient and dentist. The exposure to mercury from restoration depends on the number and size of restoration, composition, chewing habits, food texture, grinding, brushing of teeth, and many other physiological factors.[3,4]

- Human waste: amalgam fillings contribute to notable mercury levels in saliva, urine, and feces, and patients with dental amalgam excrete more than ten times more mercury in their feces than those without mercury fillings.[3,4]

- Cremation and Burial: cremation of bodies with amalgam fillings adds to air emissions and deposition onto land and into waterways.[3,4]
- Waste from dental setups: inappropriate handling of dental amalgam during mixing, triturating, filling and condensing cavities results into amalgam scrapings spilling in the dental office, further adding to increased mercury vapor levels in environment.\textsuperscript{[3,4]}

**Mercury Toxicity: Signs, Symptoms and Diagnosis**

Mercury toxicity is not easy to predict, every individual responses different to excess. Because of resemblance to common ailments, signs of mercury poisoning may not be recognized early. The major toxic effects of mercury are on the central nervous system. Paresthesia, numbness or a “pins and needles” prickling like sensation feeling is the first symptom to appear at the lowest dose. In the initial phase flulike symptoms for approximately 1-3 days are seen followed by signs and symptoms of severe pulmonary toxicity. Finally the patient will experience gingivostomatitis, metallic taste, sore throats, and ulcers of oral cavity, tremor, and memory loss, emotional liability, depression, insomnia, and shyness. Accidental exposure to large amount of mercury can results in anemia, chest pain, rapid or irregular heart beat and shortness of breath.\textsuperscript{[2,3]}

Various diagnostic methods exist to detect the level of mercury in body, including tests for blood, urine, stool, saliva, hair analysis, and others. These tests may determine if mercury is in the body and/or if it is being excreted.\textsuperscript{[2]}

**Mercury/Amalgam Hypersensitivity:** Symptoms of an amalgam allergy include skin rashes in the oral, head and neck area, itching, swollen lips, localized eczema-like lesions in the oral cavity. These clinical signs usually require no treatment and will disappear on their own within a few days of exposure. The constant exposure to mercury in amalgam restorations may sensitize some individuals, making them more susceptible to oral lichenoid lesions. These are sometimes troublesome for patients and require restoration replacement.\textsuperscript{[2]}

**Preventive Measures and Mercury Waste Management**

Use of amalgam separators can successfully reduce the amount of mercury discharge in waste water from dental offices. Floor carpeting in dental clinics should be done with smooth single sheet vinyl and there should be no joints between carpeting, should extend three to six inches up the walls. Avoid direct contact with or handling of mercury, amalgam, or debris contaminated with mercury by always wear good quality gloves. Dental clinics should have sufficient air exchange using outside exhaust system. Vacuum cleaners should not be used in areas where mercury is used. Mercury and amalgam materials should be kept away from heat in plastic labeled containers. Scrapped amalgam and excess mercury should not be drained into sinks. To prevent patient exposure always a rubber dam can be used and high-volume evacuation should be done to prevent intraoral vapor from diffusing. Waste should always be recycled.\textsuperscript{[3,4,5,6]}

**CONCLUSION**

Till today considering the demonstrated benefits of dental amalgams as compared to its adverse effects, a new scientific research is required currently to justify for discontinuing the use of dental amalgam. Allergies have been reported to both in patients and in dental personnel. Because of regulatory changes and educational effort, the use of dental amalgams is declining as dental restorative material. A strong political will and mass momentum are crucial for efficient mercury management.

**REFERENCES**