A Review

Mercury Amalgam Removal Technique- A Safe Protocol

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Abstract

Dental amalgam is the silver colored material that is commonly used to fill teeth that have decay. Amalgam is a mixture of mercury and other metals in a stable form and makes strong, long-lasting fillings.

Dental amalgam fillings have been used to restore decayed teeth for more than 150 years. Doctors and individuals request the removal of their amalgam (silver mercury) restorations due to the high mercury content. Prenatal exposure to high levels of mercury, radiation, and inflammation have been associated with adverse reproductive outcomes such as increases in preterm delivery, low birth weight, and delayed neuro development. Few data are available to evaluate the potential effects of prenatal low-level exposure to these factors. A safe protocol to replace the silver mercury filling will ensure that there is minimal if any absorption of materials while being removed. Strong alternative white composite and lab-processed materials are available today to create a healthy and functioning mouth. Preparation of the patient prior to the procedure and after treatment is vital to establish the excretion of the mercury from the body.

Keywords : Dental amalgam, Mercury, Exposure

INTRODUCTION

Despite periodic safety concerns, dental amalgam has remained one of the most cost effective and durable dental restorative materials for 150 years [1]. Dental amalgam restorations, also called silver mercury fillings, were introduced to North America in the 1830s and have been the standard restorative filling for our molars and premolars. At that time there was a lot of controversy about its intraoral use. The World Health Organization has encouraged "phasing down" of dental amalgam use and the introduction of alternative dental restoration materials but the alternatives to amalgam may be technically more difficult to place, more expensive, and not as durable as amalgam. [2]

Today, with the increase of chemicals such as pesticides, preservatives, processed ingredients in food, and diverse contaminants in our environment; sensitivities, allergies, and other illnesses are increasing rapidly.

The Brain Wash postulates that the toxins in our society are not additive but synergistic. For example, the average apple contains residue of eleven different neurotoxins and is sprayed with pesticides seventeen times prior to being picked from a tree [3]. Our food intake of many pesticides and additives is most often unknown. The level of materials such as mercury that our bodies could tolerate several decades ago may not be what we can sustain today [4].

Research on alternative dental materials has grown significantly in the past decade and their use has increased in high income countries, but dental amalgam remains the preferred restorative material in low- and middle-income nations and for the disadvantaged in high-income countries[5].

Dental personnel are at risk of exposure to metallic mercury when handling amalgam for restorations. The world dental body, Fédération Dentaire International, has established guidelines for dental amalgam use to

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ensure safety for those in practice, the general population and the environment and encourages further research into possible adverse effects of dental amalgam [6]

Amalgam & Composite Fillings

1. Advantages of Amalgam:- Ease of use, low technique sensitivity, and lower cost as compared to composite makes Amalgam popular among patients and dentists. Amalgam demonstrates favorable long-term clinical results as it has high tensile strength, excellent wear resistance and unique marginal sealing effect by corrosion products.

2. Disadvantages of Amalgam:- Amalgam is a non-insulating material that needs deeper tooth preparation; has potential cause thermal insult to pulp in deep cavities. A varnish, liner or base can prevent the damage. Extensive tooth preparations weaken the tooth structure. Amalgam needs complete removal and reinsertion on failure; repair is not advisable. It still faces controversy over mercury release and health hazards and environmental hazards associated with it. Amalgam is contraindicated in esthetic regions and pregnancy.

3. Advantages of Composite Resin:- Biggest advantage of composite is its Esthetic appearance. Universal acceptance in esthetic zones makes composite indispensable. Relatively less complex tooth preparation conserves tooth structure leaving stronger remaining tooth structure to support restoration. Micromechanical bond with tooth structure results in good retention, low micro leakage minimal interfacial staining. It has insulative effect and can be repaired.

4. Disadvantages of Composite Resin:- Polymerization shrinkage takes a toll on clinical success of composites. Highly technique sensitive and need good isolation in order to form adequate bond with tooth structure. Insertion technique is more difficult, time consuming for dentist as multiple steps like etching, bonding and segmental insertion, curing and finishing and polishing are performed. Establishing proximal and occlusal axial contacts may be difficult. May exhibit greater occlusal wear, and is less Longitivity if used without bonding or self-etched. [7]

Considerations Prior to Amalgam Removal

When the patient is seen for an initial exam, a thorough medical and dental history is taken. Records including radiographs and intraoral pictures are taken, and a comprehensive exam follows. Previous films are requested or brought in by the patient. Lengthy conversations ensue to make sure that the patient is properly prepared and that we are working with their physician, in a timely manner, to complement the detoxification process that their doctor has prescribed and is administering. The physician evaluates the overall health of the body and the ability of the individual to eliminate toxins. For example, if a patient has a leaky gut, physicians restore this prior to removal as it is difficult to flush out toxins[1]

Because mercury can cross the placental barrier, some dental schools advise against placing or removing amalgam fillings if the patient is pregnant since the release of mercury vapour is higher during these procedures. It has been reported that the mercury concentration in the blood of the fetus can be thirty times greater than the mother's blood. Since mercury can compromise kidney function at sub-clinical levels, it is considered advisable to reduce mercury exposure as much as possible in persons whose kidney function is already impaired by disease or other causes.[8] Supplements are helpful and are prescribed on an individual basis by the physician. Vitamin C intake is recommended, often with other supplements, prior to and following amalgam removal. Once the amalgam restorations have been removed, the physician continues to work with the patient to help with the detoxification of mercury that is stored in the body.[1]

Chairside Procedures

The following steps are taken when removing silver mercury fillings, to ensure minimal if any absorption sublingually, or through the mucosal tissues, and to minimize mercury vapor absorption through the blood/brain barrier.

In office, the patient is prepared as follows, prior to amalgam removal:

i. The patient is draped with a plastic apron under the dental bib to cover their clothing;
ii. A dental dam ("raincoat") is customized to fit the existing tooth/teeth to prevent particulates from contacting the oral mucosa;
iii. Underneath the dam, activated charcoal or chlorella is placed, along with a cotton roll and gauze. This helps to intercept particles and to chelate dissolved metals that seep under the dam. Often the particles are found on the sublingual tissues and lateral borders of the tongue. This must be prevented as this is the fastest absorption route into the body;
iv. The patient's face is draped under the dam, with a liner;
v. Goggles for the eyes and hair cap or bonnet protection are placed;
vi. Oxygen is supplied to the patient with a nasal mask and the mercury vapor ionizer is turned on. The vapor ionizer is a specialized air filtration system that is used to bind mercury vapors that are attached by the negative ion flow and are then carried to a positively charged ionizer plate at the opposite end of the room.

The operators also protect themselves with a filtered mask, eye and hair protection, and face

shields.

The removal of amalgam commences as follows:

i. A new dental bur is used in the handpiece to ensure easy removal;
ii. High volume suction and a continual addition of water spray are supplied to the site where the amalgam is being extracted;
iii. If possible, the amalgam restoration is sectioned and then scooped out to eliminate as much mercury vapor release as possible . The vitality of the tooth is always a concern and the less trauma to the tooth, the healthier the pulp, which supplies blood vessels and nerve supply to the tooth. The deeper the restoration, the greater the chance of pulpal degeneration, causing necrosis and subsequent abscess at the apex of the tooth, as well as bone loss.

Once the amalgam is removed completely:

i. The oxygen and protective coverings are taken away.
ii. An immediate inspection under the dental dam occurs. The gauze, cotton roll and activated charcoal/chlorella are wiped away. Gauze is then used to inspect the floor of the mouth and tongue to make sure no particulates seeped under the dam;
iii. Once all mucosal tissues are fully inspected and cleaned, the mouth is flushed with copious amounts of water, again to ensure no ingestion or absorption of amalgam particulates.

The tooth is then restored to a healthy state of form and function. Materials are taken into consideration as discussed previously on an individual need It is the dentist's ultimate responsibility to advise the patient about the strengths and limitations, if they cannot tolerate some materials. It has been the author's experience that once the amalgam materials have been removed and the patient detoxes under the supervision of their physician, the range and variety of materials increase, allowing the dentist to create the best prognosis for the tooth.[1,7]

After Amalgam Removal

A 2011 Norwegian study showed a 3-year follow up after amalgam removal with precautions in a treatment group compared to a reference group. It was found that intra-oral and general health complaints were significantly reduced 3 years after completed replacement of amalgam fillings. Previous studies have established that people with amalgam fillings have higher concentrations of mercury in blood, plasma, urine and body organs than people without amalgam fillings . The finding of reduced levels of mercury in serum and urine in this study was in agreement with data from several studies showing that replacement of amalgam fillings leads to reduced levels of mercury in blood, plasma and urine. Positive moderate correlations were found between mercury levels in both plasma and urine and subjective health complaints, and between reductions in mercury levels in these media and reductions in subjective health complaints [9]

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