Department of Health and Human Services
Centers for Disease Control and Prevention

Fact Sheet

Dental Amalgam Use and Benefits

Back to Fact Sheets and FAQs

September 2001—Dental amalgam, in widespread use for over 150 years, is one of the oldest materials used in oral health care. Its use extends beyond that of most drugs, and is predated in dentistry only by the use of gold. Dental amalgam is the end result of mixing approximately equal parts of elemental liquid mercury (43 to 54 percent) and an alloy powder (57 to 46 percent) composed of silver, tin, copper, and sometimes smaller amounts of zinc, palladium, or indium.

Because of a general decline of dental caries among school children and young adults, the use of dental amalgam began to decrease in the 1970s. There are also changes in patterns of dental caries, largely the result of topical and systemic fluoride, sealant use, improved oral hygiene practices and products and possibly dietary modifications. In 1990, over 200 million restorative procedures were provided in the United States; of these, dental amalgam accounted for roughly 96 million, a 38 percent reduction since 1979. This trend is expected to continue.

There are also reports that carious lesions today are generally smaller, easier to treat, and managed by more conservative treatment that retains tooth structure. Because of this decrease in the frequency and size of dental caries, there has been a relative increase in the use of alternative dental restorative materials. The most commonly used and less expensive of the alternative materials, however, cannot be used for large lesions and need more frequent replacement. Also, there are currently many serviceable dental amalgam restorations that will need replacing in the future. Approximately 70 percent of the restorations placed annually are replacements. Most of these replacements will require amalgam or other metallic materials, because composite materials often lack sufficient strength or durability to be considered adequate substitutes.

Today, dental amalgam is used in the following situations:

- in individuals of all ages,
- in stress-bearing areas and in small-to moderate sized cavities in the posterior teeth,
- when there is severe destruction of tooth structure and cost is an overriding consideration,
- as a foundation for cast-metal, metal-ceramic, and ceramic restorations,
- when patient commitment to personal oral hygiene is poor,
- when moisture control is problematic with patients,
- when cost is an overriding patient concern.

It is not used when:

- esthetics are important, such as in the anterior teeth and in lingual endodontic-access (root canal) restorations of the anterior teeth,
- patients have a history of allergy to mercury or other amalgam components,
- a large restoration is needed and the cost of other restorative materials is not a significant factor in the treatment decision.

Highlights of the Report on Dental Amalgam

Dental amalgam has been used as a dental restorative material for over 150 years. Amalgam remains popular because it is strong, durable and relatively inexpensive. Roughly 200 million restorative procedures performed in 1990 used amalgam. Nonetheless, amalgam use is declining because the incidence of caries is decreasing and because improved substitute materials are now available for certain applications.

Dental amalgam, an inter-metallic compound, contains lemental mercury that is emitted in minute amounts as vapor. Because vapor emitting from amalgam restorations can be absorbed by the patient through inhalation, ingestion, or other means, concerns have been raised about possible toxicity. At present, there is scant evidence that the health of the vast majority of people with amalgam is compromised, nor that removing amalgam fillings has a beneficial effect on health. It also is recognized that a total conversion from dental amalgam to alternative materials would cause a significant increase in U.S. health care costs. Nonetheless, the possibility that this material, as well as currently available alternatives, could pose health risks cannot be totally ruled out because of the paucity of definitive human studies.

Given the limitations of existing scientific data, a research program should be designed and implemented to fill as many gaps as possible in current knowledge about the potential long-term biological effects of dental amalgam and alternative restorative materials. The PHS should be a leader in this effort.

The PHS should also educate dental personnel and consumers about the risk and benefits of dental amalgam. An educational program should include information on all restorative materials to help dentists and their patients make informed dental treatment decisions, and encourage dental care providers to report adverse reactions. Such a program should promote the use of preventive measures such as fluoride and dental sealants to prevent caries and thus further reduce the need for dental restorations.

To exert greater control over dental amalgam use, the FDA should regulate elemental mercury and dental alloy as a single product. To help dentists identify patients who may exhibit allergic hypersensitivity to all restorative materials, including dental amalgam, FDA should require manufacturers to disclose the ingredients of these materials in product labeling.

Sweden, Denmark, and Germany have proposed restrictions on dental amalgam use to diminish both human exposure to and environmental release of mercury and not because of any documented health effects associated with exposure to dental amalgam.

The U.S. Public Health Service believes it is inappropriate at this time to recommend any restrictions on the use of dental amalgam, for several reasons. First, current scientific evidence does not show that exposure to mercury from amalgam restorations poses a serious health risk in humans, except for an exceedingly small number of allergic reactions. Second, there is insufficient evidence to assure the public that components of alternative restorative materials have fewer potential health effects than dental amalgam including allergic-type reactions. Third, there are significant efforts underway in the U.S. to reduce the amount of mercury in the environment. And finally, as stated previously, amalgam use is declining due to a lessening of the incidence of dental caries and the increasing use of alternative materials.