



Review Article

## Amalgam Toxicity: A Review

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### ABSTRACT

Amalgam filling material is the basis of dentistry for many years. Toxicology of elements inside is being mentioned rather than Amalgam toxicology. Mercury toxicology comes specifically to mind toxicology at the mention of Amalgam. During the preparation, placement and dismantling of amalgam cavity, patient or the physician may contact the mercury has been the subject of continuous debate. In this review of amalgam structure, the toxic effect of physician and patient are described.

**Key Words:** Toxicology, Amalgam, Mercury, Metal ions

### INTRODUCTION

Amalgam, dental restorative material, is used as filling material in dentistry for about 150 years. Amalgam which is one of the oldest filling materials is today still in use at a higher ratio in substances decay and loss occurring for various reasons. Just because it is functional and has long-life and more application indications, this has led to the acceptance and widespread use of this material in clinic. [1] Although this material is used in the restoration of anterior teeth, it is preferred on posterior region owing to its being cheap, easy, applicable and resistant to masticatory forces. [2]

Amalgam is an alloy which occurs as a result of incorporation of silver, copper, zinc and tin materials with mercury. Allergic and toxicological effects of other elements

except mercury are negligibly small. However, mercury in the composition has led to many debates related with its exposure to the patient and dentist during the preparation, installation and dismantling of filler and their effects on human health were discussed. [3-5] Some studies indicate that standard amalgam formulations compromise about 50% of elemental mercury and body absorbs mercury released. [6,7] Whereas; there are studies that state the negative effects of mercury on dentists' and dental staff's health were low, as well. [8,9]

In today restorative dentist; the criticisms made on this material increased by the reason of fact that amalgam had lack of aesthetic, involve mercury and due to new resin-based restorative materials alternative to amalgam and developments in ceramic filler with computerized system. [9]

In this review; the overall structure of amalgam and its toxic effects on the environments, patients and the dentist are examined.

## DISCUSSION

Some metal ions are released in amalgam fillings. These ions are being towards to saliva, gingival crevicular fluid, soft tissue, dentin and pulp. <sup>[10,11]</sup> Divalent metal ions released from the amalgam fillings are reported to inhibit proteolytic enzyme activity. <sup>[12]</sup> When analyzed cytotoxicity; Cu, Zn and Hg values were high, Ag value was low and had no Sn cytotoxicity. <sup>[13,14]</sup>

As in other chemical materials, if Hg that is present in amalgam does not react appropriately, it can be dangerous. The reaction of Hg with Ag-Sn alloys should exactly take place. Otherwise, mercury spill comes out around the mouth. On completion of the reaction, a very low rate of release of mercury is carried out. This is far below the health standards for mercury emissions. Mercury is an element that is ubiquitous in our environment: it enters our body every day with air, water and food. <sup>[15]</sup>

Under normal conditions, mercury is excreted from the body by undergoing a biochemical reaction. The low- amount-of-mercury is of no threat in terms of of toxicity. Moreover; mercury allergy is the body's immune response at low mercury levels. In this way, there are very small numbers of individuals who suffer from hypersensitivity and this is of no life-threatening. <sup>[16-17]</sup>

During the construction and repair of amalgam fillings, mercury vapor is released at some stage. <sup>[18]</sup> Amalgam is expected to have toxic effect in the stages of polishing and removal in condensation of amalgam. <sup>[19]</sup> It is reported that this effect can be reduced by taking measures such as using waste mercury box, water-cooled operation.

<sup>[20]</sup> In addition mercury vapor is reported to be far below the health standards. <sup>[16]</sup>

## CONCLUSION

We believe that amalgam, despite concerns, can be a good and reliable restoration material which is applied directly. Successful restorations can be obtained in case of using adequate tooth preparation and the correct use of the material.

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