Guest editorial

The use of amalgam and its relation to mercury toxicity

Recently, it was approved and then withdrawn a proposal banning the use of dental amalgam in Brazil, the Project Law n. #654/15. According to the author of the proposal, this measure would be a protection to the health of dental professionals, patients, and environment.

It is true that the prohibition of the use of dental amalgam is already in place in several countries, including Sweden, Norway, Denmark, Germany, Bulgaria, Vietnam, Thailand, and Japan. But the discussion on the subject persists in many other countries.

The entire controversy is around the use and disposal of amalgam, due to the presence of mercury in its composition, which is a highly toxic heavy metal. There are two opinions to address the problem related to mercury toxicity: the risk of human contamination and the risk of environmental contamination.

Briefly, mercury may be present in nature in three conditions: forming organic compounds (methylmercury, for example), in the form of inorganic salts (linked to chlorine, sulfur, oxygen) and as a metal compound. The human body can absorb the mercury in three different ways: ingestion, skin absorption, and inhalation of vapors. In the form of organic compounds, the main intoxication pathway occurs by ingestion, such as when we eat fish contaminated with mercury (Minamata disease), and this is the main (and more severe) way of human contamination. However, this is not related to dental practice because the mercury in dental amalgam is used as metal compound. Metal compound is not absorbed by ingestion, but it has high vapor pressure and is much absorbed by inhalation, which are odorless and colorless.

Thus, for dental professionals, the main "danger" is mercury vapors, which can be released into the atmosphere during various stages of production or removal of a restoration, mainly during polishing and removal of amalgam restoration without proper refrigeration. The mercury vapor can enter the bloodstream through the lungs by inhalation and can preferably be deposited in the lungs and kidneys, which can lead to failure by high intensity acute exposure. Furthermore, the mercury can also affect the central nervous system causing neurological abnormalities and intoxication due to chronic exposure of low intensity, known as erethism.

However, it should be remembered that although not as common in dental environment, mercury poisoning can be considered a public health problem for certain groups of workers such as miners and industry workers, such as lamp factories.

For the dentist, the main problem relates to the disposal of amalgam remnants and other materials with mercury, such as light bulbs, batteries, and thermometers. The metallic mercury, when disposed improperly in the environment can lead to contamination of water and other animals. But the most serious fact is that it can undergo a process known as biotransformation, when the metallic mercury is converted into an organic form by the action of algae and bacteria. And it is this organic form that can contaminate the environment, be absorbed by animals, as fish, and be related to the primary cause of mercury poisoning by ingestion.

In clinical practice, the risks can be minimized by adopting simple measures such as: good ventilation; use floors that allow quick handling in the event of leakage or accidental discharge of mercury; use of capsules, which have a lower amount of mercury and less possibility of contact and leakage; use of masks and gloves to avoid contact with vapor and skin absorption; proper washing of the instruments prior to sterilization, preventing possible amalgam remnants in the instruments can lead to increased formation of mercury vapors. Finally, at the time of polishing or removing amalgam fillings heating and release of vapors should be avoided by the use of new drills, intermittent cutting and abundant cooling. Amalgam remnants should be discarded in a hermetically sealed glass filled with fixing solution

or water, which must be stored on site at the office with low temperature and without receiving direct sunlight until referral to specialized laboratories in management of dental waste.

There is no scientific evidence of poisoning by mercury of dental amalgam both in patients and dental professionals. Therefore, in countries like Brazil, dental amalgam can still be a restorative material. However, the contamination risks in the environment should still be discussed and minimized.

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