

Amalgam and the environment

Laura Johnston, Paediatric Dental Officer for Birmingham Community Healthcare Trust, looks at how amalgam impacts on the environment and how dental professionals can deliver this information to patients and parents in an easy to understand way.

The start of July 2018 saw the end of the use of dental amalgam in children, and pregnant and breastfeeding women as part of an international plan to reduce the current impact of mercury pollution.

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from human release of mercury.¹

It followed a Global Mercury Assessment conducted by the United Nations Environment Programme (UNEP) in 2013 which revealed mercury from dental amalgam contributes to 10% of overall global mercury consumption.

Mercury is not biodegradable and is introduced into the environment via natural emissions from the weathering of rocks, windstorms, volcanoes and soils. It is reintroduced through the evaporation of ocean water. Mercury release via human activity includes burning fossil fuels and disposal of chemical and medical waste.

Mercury is released into the environment throughout the life-cycle of dental amalgam including; production, shipping, recycling and the preparation and removal of restorations. Amalgam residues are discharged into waste water via clinical and home waste and collect in sewage sludge via land disposal.

The incineration of medical and hazardous waste further contributes to the release of mercury into the atmosphere.

At the end of amalgam's life cycle, mercury from restorations is emitted into the atmosphere during cremation or enters soil and groundwater following burial and subsequent decomposition of the body.

Over the course of a year, mercury can reside in the air and be transported far around the globe. It is estimated that two-thirds of dental mercury is eventually released into the environment.

Humans are routinely exposed to environmental mercury via air, water, and food. Following release into the environment, non-organic forms of mercury, including those in dental amalgam, can undergo conversion to methylmercury by aquatic microorganisms.

Methylmercury is the most toxic form of mercury and is ingested by and bioaccumulates in the tissues of animals and fish. It enters the food chain of humans and animals. The accumulation of mercury can cause reproductive problems, liver and kidney damage and neurological defects in birds and mammals.

Patient awareness and access to online information may leave people with questions regarding the safety of existing amalgam restorations.

It is paramount to provide reassurance that phasing down amalgam is due to environmental factors and not patient safety.

Current evidence states that elemental mercury contained in dental amalgam is a stable form and does not present a direct health risk to individuals with existing amalgam restorations.

Because the removal and replacement of existing amalgam is not a 'closed system,' placement and removal of dental amalgam results in transient short-time exposure to the patients compared to leaving the amalgam filling intact.

Therefore existing satisfactory amalgam restorations should only be removed when clinically justified.

For patients requiring further reassurance, the Scottish Dental Clinical Effectiveness Programme (SDCEP) provides information leaflets² for patients and parents concerned over restrictions in dental amalgam.

References

1. United Nations Environment Programme. Minamata Convention on Mercury. 2017. Available at <http://www.mercuryconvention.org/Convention/Text/tabid/3426/language/en-US/Default.aspx> (accessed April 2019).
2. Scottish Dental Clinical Effectiveness Programme. Restricting the Use of Dental Amalgam in Specific Patient Groups. 2018. Available at <http://www.sdcep.org.uk/published-guidance/dental-amalgam/> (accessed April 2019).

Here has been
an advertisement.

SPRINGERNATURE