Leaching of Heavy Metals from Dental Amalgam into Teeth

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Unambiguous epidemiological evidence for mercury poisoning resulting from the use of dental amalgam is scarce. Nonetheless such poisoning remains a possibility, with far reaching consequences, as amalgam fillings are still in extremely common use worldwide, and anecdotal evidence for various toxic effects is abundant. Long-term mercury exposure of this type has been implicated in increased occurrence of diseases such as Alzheimer's and Parkinson's, as well as chronic fatigue syndrome and various kidney and GI disorders. It is generally believed that the primary pathway for poisoning is via either oral ingestion after abrasion of fillings, or inhalation of mercury vapor, however, the relative importance of another exposure pathway, i.e. via leaching directly through the enamel and dentine of the tooth into the pulp, which has an active bloodstream, is so far unknown.

We will report on a preliminary study where x-ray fluorescence mapping of 100 μm sections of human teeth has been performed at microprobe beamlines at the Advanced Photon Source, ANL. Sections of teeth that had been filled with amalgam for more than 20 years showed significant leaching of mercury, as compared to unfilled teeth, through the dentine and into the pulp boundary region, as well as leaching of other metals such as zinc.