

Dental Amalgam

Dental amalgam is not mercury

It's important to separate fear from facts. People who might be concerned about dental amalgam because it contains mercury can be reassured that credible scientific studies show no cause for alarm. Study after study shows amalgam is safe and effective for filling cavities. Mercury exists in set amalgam as inter-metallic chemical compounds, for example with silver and copper, not as elemental mercury. This is similar to the sodium in table salt; both sodium and chloride can be toxic alone but not when combined.

Measured levels of amalgam-derived mercury in organs, blood and urine are quite low, consistent with absorption of only 1 microgram/day to 3 micrograms/day.¹ Our average diets (fruits, vegetables, breads) expose us to five to ten times this amount.² Fish provide much higher amounts of dietary mercury in its most toxic and absorbable form; methyl mercury. Yet children of mothers in the Seychelles having amalgam fillings and eating fish with every meal have no mercury-related neurodevelopmental outcomes at 9 months, 30 months and 5 years.^{3,4} The world Health Organization estimates that to reach the most subtle, pre-clinical effects in the most sensitive individuals would require from 450 to 530 amalgam surfaces.¹

Dental amalgam is safe

Authoritative medical organizations (outside of dentistry) have independently reviewed the scientific literature related to neurological, degenerative, autoimmune and psychological syndromes looking at dental amalgam as a causative agent – and found nothing:

- Alzheimer's Association
- National Multiple Sclerosis Society
- Institute of Neurotoxicology and Neurological Disorders (Autism)
- American Academy of Pediatrics

Many organizations outside of dentistry have also reviewed the scientific literature looking for any credible link between dental amalgam fillings and general health problems – and have found none:

- U.S. Food and Drug Administration
- National Institutes of Health
- U.S. Public Health Service
- U.S.P.H.S. Centers for Disease Control and Prevention
- World Health Organization



- European Commission

Two prospective clinical trials (7 years) compared the neurobehavioral, neuropsychological and renal effects in children receiving dental amalgam versus resin-based composites. No adverse effects were found in either study, other than a higher re-treatment rate for children with resin-based composite fillings.^{5,6}

Dental amalgam is effective – no true direct filling “substitute” yet exists

Amalgam fillings are considered less expensive to place and generally last much longer than any other material directly placed as a filling. While plastic fillings (composite) provide satisfactory service for approximately five years they are replaced at higher rates and repaired at twice the rate of amalgam.⁷⁻⁹ Collins et al¹⁰ reported twice the failure rate for composites as compared to amalgam by the eighth year. By 10 to 11 years, failure rates as high as 40% to 50% have been reported for composites.^{11, 12} More recently, multi-surface resin-based restorations were reported to be replaced and repaired at nearly twice the rate of amalgam restorations in 2,780 U.S. Navy and Marine Corps personnel during their first five years of service.¹³

Dental amalgam is not a major source of environmental mercury

Less than one percent of mercury released to the environment from man-made sources comes from dentistry, according to the Environmental Protection Agency. First, the vast majority of mercury in surface water is from coal-fired utility plant exhaust that travels through the air then falls back to the earth. Second, very little amalgam enters surface water, because standard dental equipment and wastewater treatment facilities capture approximately 95 percent of waste amalgam. The American Dental Association and dentists across the country are committed to recovering and recycling amalgam. To further protect the environment, the ADA encourages dentists to meet with local regulators and discuss what’s right for their community when it comes to amalgam waste disposal.

No state that has examined the issue has banned or limited dental amalgam

States where either legislative or regulatory actions were taken and terminated include:

Washington	Alabama	Illinois	New Hampshire
Oregon	Georgia	Minnesota	New York
California	Ohio	Connecticut	Pennsylvania
Arizona	Maine	Massachusetts	Hawaii
Colorado	Virginia	Iowa	Vermont



References

1. Mackert JR, Berglund A: Mercury exposure from dental amalgam fillings: Absorbed dose and potential for adverse health effects. *Crit Rev Oral Bio Med* 1997;8:410-436.
2. LeBlanc J-C, Guérin T, Noël L, et al: Dietary exposure estimates of 18 elements from the 1st French total diet study. *Food Addit Contam* 2005;22:624-64
3. Watson GE, Evans K, Thurston SW: Prenatal exposure to dental amalgam in the Seychelles Child Development Nutrition Study: Associations with neurodevelopmental outcomes at 9 and 30 months. *Neurotoxicology* 2012;33:1511-1517
4. Watson GE, van Wijngaarden E, Love TMT, et al: Neurodevelopmental outcomes at 5 years in children exposed prenatally to maternal dental amalgam: The Seychelles Child Development Nutrition Study. *Neurotoxicol Teratol* 2013;39:57-62
5. DeRouen TA, Martin MD, Leroux BG, et al. Neurobehavioral effects of dental amalgam in children: A randomized clinical trial. *JAMA* 2006;295:1784-1791
6. Bellinger DC, Trachtenberg F, Barregard L, et al: Neuropsychological and renal effects of dental amalgam in children. *JAMA* 2006;295:1775-1783.
7. Bellinger DC, Trachtenberg F, Barregard L, et al: Neuropsychological and renal effects of dental amalgam in children. *JAMA* 2006;295:1775-1783.
8. Soncini JA, Maserejian NN, Trachtenberg F, et al: The longevity of amalgam versus compomer/composite restorations in posterior primary and permanent teeth. Findings from the New England Children's amalgam trial. *J Am Dent Assoc* 2007;138:763-771.
9. Mjör IA, Jokstad A: Five-year study of Class II restorations in permanent teeth using amalgam, glass polyalkenoate (ionomer) cement and resin-based composite material. *J Dent* 1993;21:338-343.
10. Collins CJ, Bryant RW, Hodge KL: A clinical evaluation of posterior composite resin restorations: 8-year findings. *J Dent* 1998;26:311-317.
11. Jokstad A, Mjör IA, Qvist V: The age of restorations in situ. *Acta Odontol Scand* 1994;52:234-242.
12. Raskin A, Michotte-Theall B, Vreven J, et al: Clinical evaluation of a posterior composite 10-year report. *J Dent* 1999;27:13-19.
13. Simecec JW, Diefenderfer KE, Cohen ME: An evaluation of replacement rates for posterior resin-based composite and amalgam restorations in U.S. Navy and Marine Corps recruits. *J Am Dent Assoc* 2009;140:200-099

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Approved ACP Board of Directors: November 4, 2014