

# CAT: Amalgam restorations do not increase a child's risk of disturbed physical development or ADHD when compared to composite

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**Clinical question:** In children aged from 1-18 years old, does the use of **amalgam restorations** increase the risk of medical problems (for example neurobehavioral, renal, psychosocial function and physical development) compared to a mercury-free restoration material during a 3 to 10 year follow-up period?



**Search strategy:**  
Evidence Search: "Dental amalgam/" or Dental amalgam.tw,kf. Limit: all children (0-18 y.o.), last 10 yrs.  
Search date: October 6th 2020  
PubMed yield: 92 articles found but only 7 were relevant for PICO  
Additional search: EBD journals, ADA EBD web site, TRIP database, C.A.T. website

**Clinical Bottom Line:** The evidence selected from the retrospective cohort study and RCT suggests that amalgam restorations **do not increase** a child's risk of disturbed physical development or ADHD when compared to composite.

The results are not statistically significant, not clinically meaningful, and clinically precise showing no effect.

### Selected Studies:

#### First study<sup>1</sup>:

A **retrospective cohort study** with a sample size of 154 504 subjects from Taiwan looking at patients with ADHD.

#### Second study<sup>2</sup>:

A **RCT** (secondary analysis as a cohort study) looking at 474 subjects from rural and urban Maine and Massachusetts evaluating the effects of composite and amalgam on physical development.

### Applicability

- Rural settings in the US and Taiwan private clinics
- Children between 1-18 years old
- Intervention: amalgam restoration
- Comparison: composite restoration
- No association between dental materials and physical development (not clinically nor statistically significant)
- Subjects with amalgam restorations have a 0.2% higher risk of having ADHD compared to composite restoration (not statistically significant nor clinically meaningful)
- Follow-up time of 5 and 10 years
- No cost or adverse effects reported

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**Risk of ADHD  
from amalgam restorations:  
1.05 CI 95% 0.96-1.14**

**32.4 per 100,000 person  
years**

**2.4% of the population diagnosed**



**Impacts on development  
(in male participants)**



**0.57% ↑ body fat**  
**0.21% ↓ BMI for age**  
**0.48% ↑ body height**

**Results not statistically  
significant**

### Evidence quality

#### First study<sup>1</sup>:

**Strengths:** Cohort study of Taiwanese population below 20 years old randomly sampled; subjects were free of outcome at baseline; examiners were blinded from the exposure; outcome was measured independently from the exposure; large sample size; adjustment for confounding factors by the cox regression analysis study.

**Limitations:** Retrospective cohort design (selection bias); excluding people with missing or incomplete registry data; some critical risk factors for ADHD were not available in the LSID2005 inability to identify a vulnerable group to mercury exposure.

### Evidence quality

#### Second study<sup>2</sup>:

**Strengths:** Randomized controlled trial with adjustment for confounding variables, the baseline data is well equilibrated, five-year follow-up, repeated measurements, randomization was stratified by number of teeth with caries

**Limitations:** Lack of blinding of the dentists, lack of validity of tools used for measurements, no collection of detailed dietary data, missing data not appropriately treated.

QR CODE

References  
1. Lin PY, Wang J, Chiang YC, Lai CY, Chang HJ, Chi LY. Risk of subsequent attention-deficit/hyperactivity disorder among children and adolescents with amalgam restorations: A nationwide longitudinal study. *Community Dent Oral Epidemiol.* 2018 Feb;46(1):47-53.  
2. Maserejian NN, Hauser R, Tavares M, Trachtenberg FL, Shrader P, McKinlay S. Dental composites and amalgam and physical development in children. *J Dent Res.* 2012 Nov;91(11):1019-25.  
3. Canvas stock image  
4.