

## **Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth.**

[Rasines Alcaraz MG](#)<sup>1</sup>, [Veitz-Keenan A](#), [Sahrmann P](#), [Schmidlin PR](#), [Davis D](#), [Iheozor-Ejiofor Z](#).

Argentine Dental Association (AOA), Junin 959, Buenos Aires, Argentina, C1113AAC.

### **Abstract**

#### **BACKGROUND:**

Amalgam has been the traditional material for filling cavities in posterior teeth for the last 150 years and, due to its effectiveness and cost, amalgam is still the restorative material of choice in certain parts of the world. In recent times, however, there have been concerns over the use of amalgam restorations (fillings), relating to the mercury release in the body and the environmental impact following its disposal. Resin composites have become an esthetic alternative to amalgam restorations and there has been a remarkable improvement of its mechanical properties to restore posterior teeth. There is need to review new evidence comparing the effectiveness of both restorations.

#### **OBJECTIVES:**

To examine the effects of direct composite resin fillings versus amalgam fillings for permanent posterior teeth, primarily on restoration failure.

#### **SEARCH METHODS:**

We searched the Cochrane Oral Health Group's Trials Register (to 22 October 2013), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2013, Issue 9), MEDLINE via OVID (1946 to 22 October 2013), EMBASE via OVID (1980 to 22 October 2013), and LILACs via BIREME Virtual Health Library (1980 to 22 October 2013). We applied no restrictions on language or date of publication when searching the electronic databases. We contacted manufacturers of dental materials to obtain any unpublished studies.

#### **SELECTION CRITERIA:**

Randomized controlled trials comparing dental resin composites with dental amalgams in permanent posterior teeth. We excluded studies having a follow-up period of less than three years.

#### **DATA COLLECTION AND ANALYSIS:**

We used standard methodological procedures expected by The Cochrane Collaboration.

#### **MAIN RESULTS:**

Of the 2205 retrieved references, we included seven trials (10 articles) in the systematic review. Two trials were parallel group studies involving 1645 composite restorations and 1365 amalgam restorations (921 children) in the analysis. The other five trials were split-mouth studies involving 1620 composite restorations and 570 amalgam restorations in an unclear number of children. Due to major problems with the reporting of the data for the five split-mouth trials, the primary analysis is based on the two parallel group trials. We judged all seven trials to be at high risk of bias and we analyzed 3265 composite restorations and 1935 amalgam restorations. The parallel group trials indicated that resin restorations had a significantly higher risk of failure than amalgam restorations (risk ratio (RR) 1.89, 95% confidence interval (CI) 1.52 to 2.35, P value < 0.001 (fixed-effect model) (low-quality evidence)) and increased risk of secondary caries (RR 2.14, 95% CI 1.67 to 2.74, P value < 0.001 (low-quality evidence)) but no evidence of an increased risk of restoration fracture (RR 0.87, 95% CI 0.46 to 1.64, P value = 0.66 (moderate-quality evidence)). The results from the split-mouth trials were consistent with those of the parallel group trials. Adverse effects of dental restorations were reported in two trials. The outcomes considered were neurobehavioral function, renal function, psychosocial function, and physical development. The investigators found no difference in adverse effects between composite and amalgam restorations. However, the results should be interpreted with caution as none of the outcomes were reported in more than one trial.

#### **AUTHORS' CONCLUSIONS:**

There is low-quality evidence to suggest that resin composites lead to higher failure rates and risk of secondary caries than amalgam restorations. This review reinforces the benefit of amalgam restorations and the results are particularly useful in parts of the world where amalgam is still the material of choice to restore posterior teeth with proximal caries. Though the review found insufficient evidence to support or refute any adverse effects amalgam may have on patients, new research is unlikely to change opinion on its safety and due to the decision for a global phase-down of amalgam (Minamata Convention on Mercury) general opinion on its safety is unlikely to change.

#### **Comment in**

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