

# Posterior teeth (Amalgam or composite resin?)

## Background

Because there are a lot of patients asking to have their metal or metallic alloy fillings removed, dentists frequently opt for composite resin. For many years now, improved adhesive techniques have made it possible to restore posterior teeth with composites, an interesting aesthetic alternative to amalgam.

## The facts

When treating a decayed tooth, the dentist must eliminate caries and restore the masticatory function of the tooth in the most durable way while meeting aesthetic needs and maintaining the patient's safety. Currently, two materials are safe and effective for direct dental fillings: amalgam, which remains an irreplaceable material despite ongoing debates, and composite resin, which is admittedly more modern but not without disadvantages. These two types of fillings are frequently found side by side in the patient's mouth. The variability of clinical situations concerning the restoration of posterior teeth requires a systematic and evidence-based decision-making process to determine the best restorative material and technique. Supported by clinical and radiographic examinations, the dentist will make an appropriate therapeutic decision. Obviously, restorations made with modern composites can be an effective alternative to traditional metal fillings because of their aesthetic and functional properties, but the pros and cons must be carefully considered and, above all, it is important to really understand the type of material we are dealing with!

## Facts about amalgam fillings

Amalgam is the most classic and traditional material associated with fillings and has been used for more than a century. Dental amalgam is an alloy that contains silver (~22 to 32%), tin (~14%) and copper (~8%), all bound with mercury. The components are mixed together to form a paste that hardens after placement. The result is certainly not very aesthetically pleasing, but amalgam offers excellent resistance to abrasion (wear) and durability.

Amalgam is very reliable and durable in the treatment of posterior teeth, which are submitted to strong mechanical forces. Also, with time, amalgam has the desirable property of self-sealing, which prevents bacterial infiltration between the tooth and the filling. Over the years, there has been an ongoing controversy concerning possible toxicity due to the mercury content. Although current scientific evidence does not show that exposure to mercury from amalgam restorations poses a serious health risk in humans, the following should be noted:

- 1) Mercury contained in dental amalgam is enclosed in its structure. An infinitely small quantity is released into the saliva during mastication. This amount is far less than what is found in certain foods, such as fish.
- 2) Like with any substance, mercury can lead to an allergic reaction, and it is up to the dentist to establish the possibility of sensitivity. In most cases, hypersensitivity reactions present as oral lichenoid lesions (reticular white patches, papules, red plaques, ulcers) involving mucosae that have been in direct contact with amalgam restorations over a prolonged period of time. Generalized allergic reactions (edema or rash) occurring immediately after placement of a dental amalgam are extremely rare and usually of short duration.
- 3) Mercury exposure from any source can be of particular concern for patients with specific medical conditions. Although dental amalgam is not linked to such conditions, the following cases should be approached with special attention and caution: a patient who is sensitive to any amalgam component or a patient who has lichen planus or significantly impaired renal function. Consequently, medical issues are the only good reason to remove and replace a clinically acceptable amalgam.
- 4) A thorough analysis of risks versus benefits should be done for pregnant and lactating patients, as well as children, when determining which restorative material to use. In many cases, amalgam may be identified as the best option. Although research evidence does not support excluding children and pregnant or lactating women from receiving amalgam fillings, common sense dictates that pregnant women should avoid any elective intervention until after delivery, and consideration should be given to amalgam alternatives in children when suitable.

## Facts about composite resin (white) fillings

Composite resin may be more modern than amalgam, but it should be viewed as an additional treatment option with specific indications instead of a simple replacement material for older amalgam. It is aesthetically pleasing and comes in a wide variety of shades that result in imperceptible restorations. Composite resin was originally used for anterior teeth, but improvements to the material have made it more wear-resistant, thereby allowing it to be used for the restoration of posterior teeth. Composite resin is a paste (resin) consisting of quartz, silica or zirconia particles of various sizes. Disadvantages of composite include sensitivity to contamination during placement, limited resistance to abrasion, difficulty to obtain a reliable marginal seal and the potential to cause irritation or an allergic reaction to specific components. Postoperative sensitivity and recurrence of decay are mainly caused by microscopic marginal defects that allow the infiltration of bacteria between the filling and the tooth. All composite resins shrink during polymerization (transformation to a solid state) and, unlike amalgams, do not have self-sealing properties. The placement of a posterior composite resin is a more complex intervention, more time-consuming and more difficult to do than an amalgam, therefore it is more expensive.



### Should we systematically replace all amalgam fillings that are in good condition?

Which restoration provides the best service to patients: amalgam or composite? With the increasing demand for aesthetic treatment options, does amalgam still have a place among modern restorative materials? Can it be effectively replaced by another durable material? There is no reason to systematically replace all amalgams. It remains an excellent dental restoration material. It provides a very good seal between the tooth and the filling, preventing the recurrence of decay. It restores strong contact points between adjacent teeth, ensuring the protection of the gums. Its resistance to compression and abrasion is strong enough to support mechanical stress generated during chewing. Replacing an amalgam just for the sake of replacing it is only acceptable if it is medically justified or if the tooth shows a clinically significant need to be restored. At this point, the patient must clearly understand the impact of such a decision. One thing remains certain: The current direct restorative materials used in dentistry, including amalgam, are safe, reliable and effective.

### What one should know about composite resin in the restoration of a posterior tooth

#### Indications for posterior composites

- 1) Preventive restorations.
- 2) Conservative restorations for small cavities.
- 3) Preservation of dental structural integrity.
- 4) Tooth with weak remaining dental structure (high fracture risk).
- 5) Patient's decision to receive a metal-free filling.

#### Contraindications for posterior composites

- 1) Impossibility to obtain or maintain an isolated operative field.
- 2) Excessive occlusive function.
- 3) Hyper-function (tightening of teeth, gnashing of teeth).
- 4) Decay extending under the gum.

#### Problems seen with composite resin (direct insertion)

- 1) **Postoperative sensitivity.**
  - **Immediate sensitivity:** a common, transient sensitivity, relieved by analgesics.
  - **Permanent sensitivity:** mainly associated with the operative technique.
    - **Thermal:** especially to cold; caused by a lack of proper sealing around the filling.
    - **Mechanical:** especially to pressure; associated with chewing stress.
- 2) Marginal gap around the restoration.
- 3) Interproximal contact point between adjacent teeth can sometimes be difficult to achieve.
- 4) Clinical longevity: In large restorations involving multiple tooth surfaces, composite resins have shorter clinical longevity than amalgams.

### Informed consent

Your prognosis is: Good  Average  Unfavorable

An informed consent is the result of a discussion between the patient and the dentist. This document is provided for information purposes and may be completed or modified during discussions with your dentist. Some dentists may provide adequate information without giving this document to the patient.

### Explanations

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### Informed consent concerning the replacement of amalgam with composite resin fillings in posterior teeth

I understand and accept the following. My dentist explained the nature of this treatment. It is possible that some other types of interventions could be necessary and that my dentist will not provide them. Alternative treatments, including non-treatment, were discussed, as were the advantages and disadvantages (especially postoperative problems) of the treatment being considered. I understand that, even if the prognosis is initially favourable, postoperative problems could still occur. I understand that my co-operation throughout the treatment is essential (attending my appointments and being on time, dental hygiene and follow-up appointments) and that if my co-operation is considered to be unsatisfactory by my dentist, my treatment will be suspended.

I have discussed all of the foregoing with my dentist and he/she answered all of my questions. I hereby consent to the treatment.

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Patient's signature

Date

Dentist's signature

Date