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# VCU

# To Repair or Replace: That is the Restorative Question

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## Abstract

**Objectives:** The purpose of this review of literature was to provide dental hygienists with evidence based dentistry to explain to their patients treatment options available for teeth with faulty restorations

**Methods:** Studies pertaining to the topic were searched using PubMed database. Keywords used in the search were amalgam, composite, restoration, replace, repair, and contraindications.

**Results:** Research shows that when it comes to composite restorations generally doctors will replace them in order to get an accurate color shade to match the patient's teeth. In regards to posterior teeth there are multiple risk factors for repairing amalgam such as endodontic involvement and denture care. Clinically there is no significant difference between repairing or replacing faulty restorations

**Conclusion:** Due to the positive results of both repairing and replacing restorations, it ultimately comes down to a patient to patient basis. Practitioners must also take into consideration risk factors that the patient may present with, cost association/coverage, and patient preference.

## Introduction

- Dental caries is the most common chronic disease among youth
  - 45.8% aged 2 – 19 years
  - 13% untreated
- Dental caries are more prevalent in adults
  - ~ 91% aged 20 – 64 years
  - 27% untreated
- Amalgam / composite restorations are most common treatment
- When damage occurs, restorations need to be fixed to prevent further damage to natural anatomy

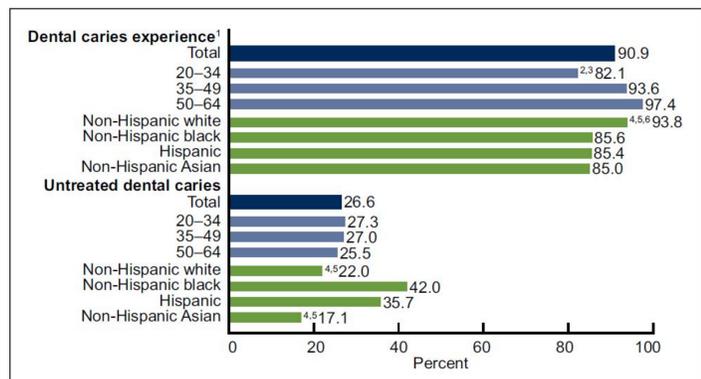


Figure 1: Prevalence of dental caries among adults in the United States, 2011-2012

## Amalgam vs Composite

- Metal alloy
- Mercury, zinc and copper are main components
- Used in class 1, 2, and 5 (where esthetics not required)
- Can restore crown
- Used in retrograde root canal fillings
- Core material in abutment teeth



Figure 2: Amalgam restorations

- Resin with silica particles as fillers
- Utilizes acid etching and bonding
- Activated via UV light
- Made to match tooth color
- Widespread use due to various compositions



Figure 3: Composite restorations

## Results

- A study done by Reinelt Kramer observed the ten-year clinical performance of posterior resin composite restorations. Molar restorations performed worse than premolar restorations regarding marginal, filling, and tooth integrity. The primary causes of degradation were chipping and cracking of molar restorations after 10 years. Marginal staining increased 43% at four years, 52% at eight years, and 71% at 10 years. After the 10-year study, tooth integrity decreased due to an increase of enamel cracks and chipping from 9% to 89% (6).
- Another study analyzed the long-term performance of refurbished amalgam restorations. Restorations were examined at baseline and after 10 years on the following eight parameters: anatomy, roughness, luster, secondary caries, marginal adaptation, occlusal contact, marginal staining and tooth sensitivity. After 10 years, 19 repaired, 13 replaced, and 17 untreated individuals were assessed. All three test groups showed similar clinical performances in all eight tested parameters. Although the three test groups displayed deterioration over time, they were all classified as clinically acceptable upon completion of the study (7).
- The following study observed the effects of refurbishing amalgam and composite restorations over 12 years. Refurbishment was done using carbide burs and polishing systems. This produced instantaneous results in the improvement of the anatomy, roughness, luster, and marginal staining. After the 12 years it was found that both amalgam and composite restorations experienced a slight decline in performance. Amalgam restorations were found to keep the anatomy better than composite restorations. On the other hand, composite restorations were found to have better marginal adaptation than amalgam restorations (8).
- One study examined the longevity of composite restorations made on stained dentin where amalgam restorations previously resided showed the strength. 90 individuals were observed over a mean time frame of 40 months. Four failures occurred: one due to fracture, one due to inadequate proximal contact, and two due to endodontic complications. All failures were unrelated to inadequate adhesion of composite, and secondary caries. (10)
- Dentists of the National Dental Practiced Based Research Network hypothesized that there is no significant difference in whether you restore or replace restorations after the first 12 months.. It was observed in the study that within the year of primary treatment of the restorations, secondary treatment was needed for the restorations that were replaced 5% of the time, while secondary treatment was needed for the restorations that were repaired 7% of the time (11).
- One study discussed the decision making process behind the replacement of faulty restoratives. Specifically for amalgam restorations marginal defects and cusp fracture are the most common reasons for replacement. For composite restorations its fatigue shrinkage, higher wear rates, defective contact points, and discoloration. From this study, a criteria for the replacement of restorations was made if there is a suspicion of caries. It stated for both amalgam and composite should be considered for replacement if they are at a high age (more than 15 years old for amalgam and more than 10 years old for composite), if they have imperfections at the margins, if they have have clinically visible secondary caries, or if there is pain within composite restorations. Although brown discoloration does not necessarily mean that there are secondary caries present, these were replaced due to the wishes of most patients and esthetics should be considered a critical factor. (12)
- The following study observed the dentist preference of repairing or replacing restorations. From these faulty restorations it was found that dentists who placed the original restoration would most likely repair it, and this occurrence was particularly found with molars. This is due to the fact that molar restorations generally has less longevity than anterior restorations (11)

## Faulty Restorations



Figure 4: Faulty composite restoration



Figure 5: Faulty amalgam restoration

## Conclusion

- There is not a clinically significant difference between repairing and replacing faulty restoration
- Generally primary dentists prefer to repair their restoration, while secondary dentists prefer to replace faulty restoration
- Increasingly patients are requesting to replace amalgam restorations to composite for aesthetic purposes

## Discussion

Although it was found through the studies that there is not a significant difference of the efficacy between choosing to repair or replace faulty restorations, the determining factor comes down to the patient's and the dentist's preference. It was proven that clinical strength of composite is not compromised when placement occurs on dentin previously covered with amalgam (10). Amalgam strength was also proven unaffected when previous restorations are repaired (11).

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