Repair vs. Replacement? Limited Evidence Suggests no Significant Difference in Likelihood of Failure: C.A.T.

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Clinical Problem

- The annual failure rate of repaired resin composite restorations ranges from 2.5% to 5.7%, while it is around 9.3% for repaired amalgam restorations [1, 2];
- On average, 31.3% of restorations are repaired, while the rest are replaced [3];
- Replacing a restoration can lead to a significant loss of tooth structure, contributing to a shorter tooth life cycle;
- Dentists often have to decide whether to repair or replace a restoration, and it is unclear whether repaired restorations will have a similar lifespan to replaced ones;
- Currently, there are no established guidelines for whether old restorations should be replaced or repaired.

Clinical Question

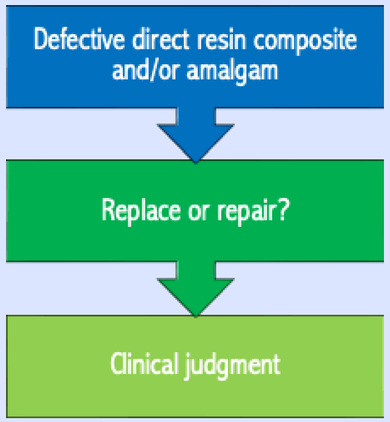
What is the impact of repairing versus replacing partially defective resin composite/amalgam restorations on the likelihood of restoration failure in adults over a period of more than one year?

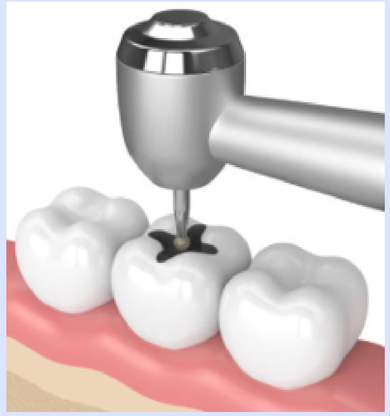
Evidence Search

Mesh Terms: "Dental Restoration Failure", "Dental Restoration Repair", "dental restoration, permanent", "Composite Resins", "dental amalgam";
Key words: dental restoration fail*, restoration fail*, repair*, dental restoration repair*, restoration repair*, permanent dental filling*), permanent filling*, permanent dental restoration*, permanent restoration*, Composite resin*, dental amalgam, tooth amalgam, amalgam;
Search date: 2023-03-14;
PubMed yield: 161 evidence sources (restricted to systematic review, meta-analysis and RCTs; time limitations of 5 years);
Additional search: EBD journals, ADA EBD web site, TRIP database, C.A.T. website);
Main evidence source: Mendes, L. T., (2022). Risk of failure of repaired versus replaced defective direct restorations in permanent teeth: a systematic review and meta-analysis. Clinical oral investigations, 26(7), 4917–4927.

Clinical Bottom Line

Limited evidence suggests, there is no clinically meaningful difference in failure rates between the two methods. However, due to the high risk of bias and low certainty of evidence, further research is needed to confirm the findings.
Overall, the decision to repair or replace an amalgam restoration should be made on a case-by-case basis, taking into account factors such as the extent of the decay, the condition of the tooth, the age and health of the patient, and the preferences of the patient and the dentist.





https://www.istockphoto.com/photo/3d-render-of-teeth-with-dental-drill-gm1094536680-293768193?phrase=amalgam%20restoration%20tooth

Results

- Composite restorations: repair has 0.4% (95% CI: (-0.13, 0.354))lower risk of failure, but not statistically or clinically significant;
- Amalgam restorations: repair has 9.9% (95% CI: (-0.0945,0.966)) higher risk of failure, but not statistically or clinically significant;
- Overall: repair has 3% (95% CI: (-0.0882, 0.3294)) higher risk of failure, but not statistically or clinically significant.

Strengths/Limitations

Strenghts:
- Rigorous methodology of the systematic review;
- Comparable protocol for restoration repair, ensuring consistency and easier comparison across studies;
- Independent, blinded reviewers to reduce bias and increase objectivity;
- Comparable teeth and restoration types;
- Including all languages and no publication year restrictions.

Limitations:
- Three non-randomized controlled trials with low precision;
- Small sample sizes;
- High statistical heterogeneity;
- No pulp injury assessment as a secondary outcome;
- No separate analysis conducted for anterior and posterior restorations;
- No consideration of confounding factors and different restoration settings;
- Variations in intervention techniques, settings and participant ages.

Applicability

- Both methods are commonly performed in clinical practice in Canada;
- Outcomes were evaluated by measuring the risk of failure of repaired and replaced restorations which is easily measurable clinically;
- Despite the limited evidence, repairing defective restorations is in line with minimal intervention dentistry as compared to replacement and may improve tooth longevity and is widely taught in dental schools across North America;
- Population differences exist between university and private practice settings;
- Causes of failure and the need for restoration repair are not fully understood;
- Two studies utilized undergraduate student data, making populations not necessarily comparable.

References
Kanzow, P., (2020). Retrospective analysis on the repair vs. replacement of composite restorations. Dental materials : official publication of the Academy of Dental Materials, 36(1), 108–118.
2- Opdam, N. J., (2012). Longevity of repaired restorations: a practice based study. Journal of dentistry, 40(10), 829–835.
3-Kanzow, P., (2018). Understanding the management and teaching of dental restoration repair: Systematic review and meta-analysis of surveys. Journal of dentistry, 69, 1–21.
4-Mendes, L. T., (2022). Risk of failure of repaired versus replaced defective direct restorations in permanent teeth: a systematic review and meta-analysis. Clinical oral investigations, 26(7), 4917–4927.

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