Systematic Review

Treatment options for large posterior restorations: a systematic review and network meta-analysis

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Supplemental material is available online.

ABSTRACT

Background. The best treatment option for large caries in permanent posterior teeth is still a matter of uncertainty in dental literature. The authors conducted a network meta-analysis to address the challenges related to rehabilitation of these teeth.

Types of Studies Reviewed. The authors selected prospective and retrospective studies that compared at least 2 different treatment alternatives for permanent teeth with a minimum of 5 years of follow-up. The authors searched databases from MEDLINE, Scopus, Cochrane Library, and Web of Science in October 2019 without language or year of publication restrictions.

Results. From 11,263 studies identified, 43 studies fulfilled the eligibility criteria and were included in the final review. Only 13 studies were randomized controlled trials and were classified as low risk of bias. Gold (annual failure rate of 0.29%) and metal ceramic (annual failure rate of 0.52%) crowns performed better for indirect restorations and direct resin composite performed better for direct restorations (annual failure rate of 2.19%). The most substantial comparisons were between feldspathic and glass ceramics, followed by direct resin composite and amalgam; there were no statistically significant differences between these interventions. Results of the pairwise meta-analysis showed mainly glass ionomer as significantly more prone to failure than amalgam and direct composite resin.

Conclusions and Practical Implications. Reference standard direct and indirect materials except for glass ionomer can be used for restorations of large posterior caries.

Key Words. Restorative materials; dental restorations; dental fillings; dental composites; operative dentistry; clinical studies/trials; evidence-based dentistry.

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There is a tendency for increased expenditures for dental treatment over time,[1] and the major part consists of the placement and replacement of restorations.[2] In this context, although there is some evidence on the indication of composites as the best option for restoring small defects in load-bearing restorations,[3,4] little information is available concerning more extensive restorations. The risk of failure for a posterior restoration increases 30% through 40% for every extra added surface.[5] In addition, the survival of restorations is influenced by several other factors, such as material properties,[6] oral health care providers' choices,[7] and patient characteristics, that is, the presence of caries risk and occlusal stress.[7,8]

Even with the shift of choice from amalgam to composite resin that has occurred in the past several decades,[9] it is still possible to find systematic reviews in the literature supporting both materials.[4-6,10] Indirect restorations are also considered as an alternative for restoring large defects, as they have shown good clinical performance in general practice[11] and a lower need for repair and replacement.[12] Several types of materials for indirect restorations are available, although some ceramic types, such as feldspathic and glass ceramics, might be less suitable for high-functional load

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