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Review article

Longevity of direct and indirect resin composite restorations in permanent posterior teeth: A systematic review and meta-analysis

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ABSTRACT

Objectives: The aim of this systematic review and meta-analysis was to assess the differences in clinical performance in direct and indirect resin composite restorations in permanent posterior teeth.
Sources: PubMed, the Cochrane Library, Web of Science, Scopus, LILACS, BBO, ClinicalTrials.gov and SiGLE were searched without restrictions.
Study selection: We included randomized clinical trials (RCTs) that compared the clinical performance of direct and indirect resin composite restorations in Class I and Class II cavities in permanent teeth, with at least two years of follow-up. The risk of bias tool suggested by Cochrane Collaboration was used for quality assessment.
Data: After duplicate removal, 912 studies were identified. Twenty fulfilled the inclusion criteria after the abstract screening. Two articles were added after a hand search of the reference list of included studies. After examination, nine RCTs were included in the qualitative analysis and five were considered to have a 'low' risk of bias. The overall risk difference in longevity between direct and indirect resin composite restorations in permanent posterior teeth ($p > 0.05$) at five-year follow-up was 1.494 [0.893–2.500], and regardless of the type of tooth restored, that of molar and premolars was 0.716 [0.177–2.888] at three-year follow-up.
Conclusions: Based on the findings, there was no difference in longevity of direct and indirect resin composite restorations regardless of the type of material and the restored tooth.
Clinical significance: Contemporary dentistry is based on minimally invasive restorations. Any indication of a less conservative technique must have unquestionable advantages. *In vitro* and *in vivo* studies reveal contradictory evidence of the clinical performance of direct and indirect resin composite restorations in posterior teeth. Thus this study clarified this doubt.

1. Introduction

Direct and indirect resin composite restorations are widely used in contemporary dentistry to restore posterior teeth [1–3]. Traditionally, the choice between the use of direct and indirect techniques for resin composites in posterior teeth is based on the size of the cavity to be restored. Small and medium cavities are usually restored with direct composite resin restorations. On the other hand, in large cavities, where the width of the isthmus exceeds two-thirds of the distance between facial and lingual cusp tips, indirect restorations become indicated [3–6]. However, because of the evidence that direct resin composite restorations have properties suitable for use in posterior teeth [7–11], do not require invasive preparation and [12] are made in only one session at low cost, many dentists are also using them in large cavities, making the clinical decision challenging [14].

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Table 1
Eletronic databases and research strategies (18/AUG/2015).

PubMed

#1Molar [MH] OR Molar [TIAB] OR Molars [TIAB] OR Bicuspid [MH] OR Bicuspid [TIAB] OR Premolar* [TIAB] OR Dentition, Permanent [MH] OR Permanent Dentition [TIAB] OR Tooth erosion [MH] OR Tooth erosion [TIAB] OR Erosive tooth wear [TIAB] OR Posterior teeth [TIAB] OR Posterior tooth [TIAB] OR Dental caries [MH] OR Dental caries [TIAB] OR Dental decay [TIAB] OR Class I [TIAB] OR Class II [TIAB] #2 Indirect composite resin* [TIAB] OR Indirect resin* [TIAB] OR Indirect posterior composite [TIAB] OR Indirect restoration* [TIAB] OR Indirect resin composite [TIAB] OR Indirect composite [TIAB] OR Indirect [TIAB] OR Inlays [MH] OR Inlays [TIAB] OR Inlay [TIAB] OR Overlay* [TIAB] OR Onlay* [TIAB] #3 (Composite resins [MH] OR Composite resins [TIAB] OR Composite resin [TIAB] OR Composite restorative materials [TIAB] OR Resin composit* [TIAB] OR Resin composite restoration* [TIAB] OR Posterior composite restoration*[TIAB] OR Resin-based composite*[TIAB] OR Tooth-colored restorat* [TIAB] OR Dental composite* [TIAB] OR Composite restoration* [TIAB]) Direct composite resin* [TIAB] OR Direct resin composite restoration* [TIAB] OR Direct composite restorations [TIAB] OR Direct posterior composite* [TIAB] OR Direct restoration* [TIAB] OR Direct resin composite [TIAB] OR Direct composite [TIAB] OR Direct [TIAB]) #1 AND #2 AND #3

SCOPUS

#1 TITLE-ABS-KEY ("Molar" OR "Molars" OR "Bicuspid" OR "Premolar" OR "Premolars" OR "Permanent Dentition" OR "Tooth erosion" OR "Erosive tooth wear" OR "Posterior teeth" OR "Posterior tooth" OR "Dental caries" OR "Dental decay" OR "Class I" OR "Class II") #2 TITLE-ABS-KEY ("Indirect composite resin" OR "Indirect composite resins" OR "Indirect resin" OR "Indirect resins" OR "Indirect posterior composite" OR "Indirect restoration" OR "Indirect restorations" OR "Indirect resin composite" OR "Indirect composite" OR "Indirect" OR "Inlay" OR "Inlays" OR "Overlay" OR "Overlays" OR "Onlay" OR "Onlays") #3 TITLE-ABS-KEY ("Composite resins" OR "Composite resin" OR "Composite restorative materials" OR "Resin composite" OR "Resin composites" OR "Resin composite restoration" OR "Resin composite restorations" OR "Posterior composite restoration" OR "Posterior composite restorations" OR "Resin-based composite" OR "Resin-based composites" OR "Tooth-colored restoration" OR "Tooth-colored restorations" OR "Dental composite" OR "Dental composites" OR "Composite restoration" OR "Composite restorations") AND ("Direct composite resin" OR "Direct composite resins" OR "Direct resin composite restoration" OR "Direct resin composite restorations" OR "Direct composite restorations" OR "Direct posterior composite" OR "Direct posterior composites" OR "Direct restoration" OR "Direct restorations" OR "Direct resin composite" OR "Direct composite" OR "Direct") #1 AND #2 AND #3

Web of Science

#1 Topic: ("Molar" OR "Molars" OR "Bicuspid" OR "Premolar" OR "Premolars" OR "Permanent Dentition" OR "Tooth erosion" OR "Erosive tooth wear" OR "Posterior teeth" OR "Posterior tooth" OR "Dental caries" OR "Dental decay" OR "Class I" OR "Class II") #2 Topic: ("Indirect composite resin" OR "Indirect composite resins" OR "Indirect resin" OR "Indirect resins" OR "Indirect posterior composite" OR "Indirect restoration" OR "Indirect restorations" OR "Indirect resin composite" OR "Indirect composite" OR "Indirect" OR "Inlay" OR "Inlays" OR "Overlay" OR "Overlays" OR "Onlay" OR "Onlays") #3 Topic: ("Composite resins" OR "Composite resin" OR "Composite restorative materials" OR "Resin composite" OR "Resin composites" OR "Resin composite restoration" OR "Resin composite restorations" OR "Posterior composite restoration" OR "Posterior composite restorations" OR "Resin-based composite" OR "Resin-based composites" OR "Tooth-colored restoration" OR "Tooth-colored restorations" OR "Dental composite" OR "Dental composites" OR "Composite restoration" OR "Composite restorations") AND ("Direct composite resin" OR "Direct composite resins" OR "Direct resin composite restoration" OR "Direct resin composite restorations" OR "Direct composite restorations" OR "Direct posterior composite" OR "Direct posterior composites" OR "Direct restoration" OR "Direct restorations" OR "Direct resin composite" OR "Direct composite" OR "Direct")

Cochrane Library

ID Search Hits
#1 MeSH descriptor: [Molar] explode all trees
#2 molar
#3 molars
#4 #1 or #2 or #3
#5 MeSH descriptor: [Bicuspid] explode all trees
#6 bicuspid
#7 premolar*
#8 #5 or #6 or #7
#9 MeSH descriptor: [Dentition, Permanent] explode all trees
#10 dentition, permanent
#11 permanent dentition
#12 #9 or #10 or #11
#13 MeSH descriptor: [Tooth Erosion] explode all trees
#14 tooth erosion
#15 erosive tooth wear
#16 #13 or #14 or #15
#17 posterior tooth or posterior teeth
#18 MeSH descriptor: [Dental Caries] explode all trees
#19 dental caries
#20 dental decay
#21 #18 or #19 or #20
#22 "class I" or "class II"
#23 #4 or #8 or #12 or #16 or #17 or #21 or #22
#24 Indirect composite resin* or Indirect resin* or Indirect restoration* or Indirect resin composite or Indirect composite or Indirect
#25 Indirect posterior composite
#26 #24 or #25
#27 MeSH descriptor: [Inlays] explode all trees
#28 inlays
#29 inlay
#30 overlay or overlays or onlay*
#31 #27 or #28 or #29 or #30
#32 #26 or #31
#33 MeSH descriptor: [Composite Resins] explode all trees
#34 composite resins
#35 composite resin or Resin composit* or Resin composite restoration* or Resin-based composite* or Tooth-colored restorat* or Dental composite* or Composite restoration*
#36 Composite restorative materials
#37 #33 or #34 or #35 or #36
#38 Direct composite resin* or Direct resin composite restoration* or Direct composite restorations or Direct posterior composite* or Direct composite or Direct
#39 #37 and #38
#40 #23 and #32 and #39

LILACS and BBO