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Effect of enamel bevel on retention of cervical composite resin restorations: A systematic review and meta-analysis☆

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ABSTRACT

Objectives: To identify if enamel bevelling, compared to no treatment, improves the retention rates and marginal discolouration of cervical composite restorations in non-carious cervical lesions (NCCLs) of adult patients, through a systematic review of the literature and meta-analysis.
Sources: MEDLINE, Scopus, Web of Science, LILACS, BBO Library, Cochrane Library and SIGLE were searched without restrictions, as well as the abstracts of the annual conference of the IADR and the trials registry. Dissertations and theses were searched using the ProQuest Dissertations and Periódicos Capes Theses databases.
Study selection: We included randomised clinical trials (RCTs) that compared the retention rates restorations in NCCLs placed with or without bevel with at least 1-year follow-up. The risk of bias tool of the Cochrane Collaboration was used for quality assessment.
Data: After duplicate removal, 1356 articles were identified. After abstract screening, 14 studies remained and this number was reduced to four after examination of the full-texts. Only two were considered to have a 'low' risk of bias. The overall risk difference was 0.0 (95% CI −0.04 to 0.04) for the retention rate ($p = 0.91$) and 0.05 (−0.02 to 0.13) for the marginal discolouration ($p = 0.17$).
Conclusions: No superiority of bevelled restorations was observed in the short-term follow-up of 1-year, although this conclusion was based on only two RCTs. There is not enough evidence to support the bevelled technique over non-bevelled for NCCLs over longer periods of time. Better standardization and reporting of RCTs of enamel bevelling are necessary in longer-term follow-ups.
Clinical significance: The literature still lacks a body of evidence to support the benefits of enamel bevel over non-bevelled for longer-term follow-ups, and future randomised clinical trials with low risk of bias should be conducted.

☆ PROSPERO registration number: CRD42014006629.

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1. Introduction

The prevalence[1–3] and severity of non-carious cervical lesions (NCCLs) has increased due to the rise in the elderly population. This has increased the attention to these lesions.[4] In most cases, controlling the etiological factor treats these lesions and, when indicated, restoring the missing tooth structure.[5,6] However, restoring NCCLs is still a challenge. Dentine in these lesions is usually sclerotic, with partial or total obliteration of dentine tubules, which is an unfavourable factor for dentine bonding.[7]

Recently published papers revised some alternatives to improve the bonding to dental substrates and, although they are all promising, they focus mainly on the dentine substrate.[8] Considering the enamel substrate, the placement of an enamel bevel may be a good option, taking into consideration that laboratory studies have shown that this procedure can reduce marginal microleakage,[9–11] reduce the risk of fracture in the marginal enamel,[12] result in better adhesion[13] and yield to improved aesthetics.[14] However, despite these positive laboratorial findings, clinical studies that evaluated the effect of enamel bevel on the retention and performance of composite restorations in NCCLs have shown controversial results.[15–18]

While some researchers consider the bevel a solution to improve the bonding of some etch-and-rinse and self-etch adhesive systems,[16–18] other authors have stated that the bevel does not improve retention after a 3-year period.[15] Due to the conflicting results of the available clinical trials, a systematic review was conducted with the aim to answer the following focused question: ''Does enamel bevelling compared to no enamel bevelling improve the retention of composite restorations in NCCL of adult patients?''

2. Materials and methods

2.1. Protocol and registration

We registered the study protocol at the PROSPERO database (www.crd.york.ac.uk/PROSPERO) under the number CRD42014006629, and we followed the recommendations of the PRISMA statement for the report of this systematic review.[19]

2.2. Eligibility criteria

The controlled vocabulary (mesh terms) and free keyword in the search strategy (Table 1) was defined based on the elements of the PICOS question:

1. Population (*P*): adult patients with the need of composite restorations in NCCLs.
2. Intervention (*I*): placement of composite restorations in permanent teeth after enamel bevelling.
3. Comparison (*C*): placement of composite restorations in permanent teeth with no enamel bevelling.
4. The outcome (*O*): retention rate was not used in the search strategy to maximise the sensitivity over the specificity of the search strategy.
5. Study design (*S*): randomised clinical trials (RCTs).

Only RCTs that compared the clinical effectiveness of composite resin restorations in NCCLs placed with and without enamel bevelling in permanent dentition of adult patients of any age group were eligible. We included parallel or split-mouth design clinical human trials (Table 1).

A minimum follow-up of 1-year was required for evaluation. The retention rate was the primary outcome of the study and the marginal discolouration was the secondary outcome. No restrictions regarding settings were established (academic university department, dental hospital, primary care, private practice).

Non-controlled clinical trials, editorial letters, pilot studies, historical reviews, in vitro studies, cohort, observational and descriptive studies, such as case reports and case series, were excluded. Additionally, RCT studies were excluded if: (1) other types of cavity were treated other than NCCLs; (2) bases or liners were always used before adhesive application, and (3) there was lack of an adequate control group.

2.3. Information sources and search

To identify trials to be included for this review, we searched on the electronic databases MEDLINE via PubMeb, Scopus, Web of Science, Latin American and Caribbean Health Sciences Literature database (LILACS), Brazilian Library in Dentistry (BBO) and Cochrane Library (Table 1). An expert librarian (D.M.) guided the whole search strategy. We hand-searched the reference lists of all primary studies for additional relevant publications and the related articles link of each primary study in the PubMed database. No restrictions were placed on the publication date or languages.

The abstracts of the annual conference of the International Association for Dental Research (IADR) and their regional divisions (1990–2014) were also searched and authors of relevant abstracts were contacted for further information. The grey literature was explored using the database System for Information on Grey literature in Europe (SIGLE). Dissertations and theses were searched using the ProQuest Dissertations and Theses Fulltext database as well as the Periódicos Capes Theses database.

To locate unpublished and ongoing trials related to the review question, the following trials registries were also searched: Current Controlled Trials (www.controlled-trials.com), International Clinical trials registry platform (http://apps.who.int/trialsearch/), the ClinicalTrials.gov (www.clinicaltrials.gov), Rebec (www.rebec.gov.br) and EU Clinical Trials Register (https://www.clinicaltrialsregister.eu).

The search strategies defined for the databases described above are listed in Table 1. The search strategy was appropriately modified for each database and performed by two reviewers (M.S. and A.R.) to identify eligible studies. Full-text versions of the papers that appeared to meet the inclusion criteria were retrieved for further assessment and data extraction.

2.4. Study selection and data collection process

Initially, the articles were selected by title and abstracts according to the previously described search strategy (Table 1).

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