Sealants generally show equal performance regardless of tooth type and position

Abstracted from

Papageorgiou SN, Dimitraki D, Kotsanos N, Bekes K, van Waes H.

Performance of pit and fissure sealants according to tooth characteristics: A systematic review and meta-analysis. *J Dent* 2017; **66:** 8-17.

Address for correspondence: SN Papageorgiou, Clinic of Orthodontics and Pediatric Dentistry, Center of Dental Medicine, University of Zurich, Zurich 8032, Switzerland. E-mail: snpapage@gmail.com.

Question: Do mouth side, arch or tooth type influence the retention and effectiveness of fissure sealants?

Data sources Medline (PubMed), Cochrane Central Register of Controlled Trials (CENTRAL), Virtual Health Library (including Bibliography Brazilian Dentistry and LILACS), Scopus, and ISI Web of Knowledge, Google Scholar, International Standard Registered Clinical/soCial sTudy Number registry, Directory of Open Access Journals, Digital Dissertations and metaRegister of Controlled Trials) and the reference lists of included trials.

Study selection Randomised clinical trials (RCT) on humans including at least one trial arm comparing clinical performance of pit and fissure sealants with any other active, control or placebo were considered.

Data extraction and synthesis Independently and in duplicate by two reviewers using piloted data extraction forms. Risk of bias was carried out by two reviewers using the Cochrane Risk of Bias tool. Paule-Mandel random-effects meta-analyses of Relative Risks (RRs) and their 95% confidence intervals (CIs) were calculated.

Results Sixteen trials were included with 2,778 participants (mean age 8.4 years). There was no significant difference in caries incidence or sealant retention rate for: mouth side; maxilla vs mandible; or tooth type for: 1st permanent molar vs 2nd permanent molar; 1st permanent molar vs 2nd primary molar or 1st primary molar vs 2nd primary molar (very low to low quality evidence). However, there was a difference between 1st permanent molars and premolars where sealed premolars were significantly less likely to develop caries or sealant loss (low to moderate evidence quality).

Conclusions Fissure sealants seem to perform similarly for sealant retention and caries rate for different sides of mouth, arches and tooth types apart from between 1st permanent molars and premolars, where premolars have more favourable results. The quality of the evidence however, is very low to moderate and this should be borne in mind when interpreting the results.

Commentary

The efficacy of dental sealants has been proven in various systematic reviews including a Cochrane review.[1] These reviews have extensively evaluated various aspects of sealant efficacy and have comprised both individual and cluster randomised trials.[2]

Owing to the strong evidence in favour of sealants, various guidelines recommend their use for both deciduous and permanent teeth.[3] Although some systematic reviews have shown sealants to be more cost-effective in high caries risk patients, guidelines recommend more research regarding sealant use as per caries-risk and other patient factors.[3,4] Nonetheless, to date no guidelines/reviews have categorised sealant efficacy based on tooth characteristics. This review attempts to evaluate the evidence for sealant efficacy as per tooth characteristics including tooth type, jaw or side and the authors rightly claim that the conclusion from this review might help to refine the guidelines and would assist in clinical decision making.

The authors followed Cochrane and PRISMA guidelines for conducting and reporting the review and registered the protocol in PROSPERO *a-priori*. Unlike previous systematic reviews which only considered the use of sealants in one of the intervention arms as inclusion criteria, this review had an additional criterion and included only those studies which reported sealant efficacy in terms of specific tooth characteristics.

Both electronic and manual searching of the literature was done without any time/ language restrictions. In contrast to the Cochrane guidelines only one author was responsible for literature search while subsequently the eligibility of identified studies and data extraction were by two independent authors. A total of 20 studies were considered eligible as per the inclusion criteria but four studies could not be included as additional data were required for inclusion but the authors of these studies could not be contacted. Risk of bias was evaluated using Cochrane's RoB tool and high risk of bias was found in many trials among which blinding of outcome assessment was the major concern.

The review evaluated data for two main outcomes; 'caries incidence' and 'sealant-loss'. Random effects meta-analysis was carried out for both the outcomes and steps were taken to compensate for heterogeneity of included trials. No significant differences were observed for side comparisons (right vs left), jaw comparisons (maxilla vs mandible) and different tooth comparisons (permanent first molar to permanent second molar, permanent first molar to deciduous second molar, deciduous first molar to deciduous first molar) apart from when permanent

first molars were compared with permanent premolars, where significantly more carious lesions developed and more sealant-loss was observed in the permanent first molars.

The authors have judiciously identified reasons for more sealant loss in permanent molars compared to premolars and these include; (i) larger total surface area in molars, thus requiring more sealant to be applied but also more chances of failure, (ii) easier isolation leading to effective bonding of sealants in premolars and (iii) less occlusal loading in premolars. Though less 'caries-incidence' in sealed premolars might be attributed to lower sealant-loss, it is pertinent to note that the observed difference may also be due to inherent lower caries-incidence of premolars as compared to molars.

Based on this review it can be concluded that sealant application is effective, irrespective of jaw/side/tooth type (except when premolars are compared with first permanent molars). Conclusively though, at this juncture, a change in guidelines cannot be recommended but more research is warranted to evaluate sealant efficacy in terms of tooth characteristics. For this, researchers should be encouraged to report their sealant based studies mentioning baseline data, caries risk of the patients and outcome measurement comparing intervention with comparator but including individual tooth characteristics as well.

Neeraj Gugnani[1] and Shalini Gugnani[2]

[1] Department of Pedodontics and Preventive Dentistry

[2] Department of Periodontics and Oral Implantology

DAV(C) Dental College Yamunanagar, Haryana, India

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