

# Impact of pit and fissure sealants on caries prevention in primary dentition

## Systematic Review

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### INTRODUCTION

Through current scientific evidence, the application of pit and fissure sealants in permanent dentition is a procedure consistently based on the prevention of caries, however, little evidence supports the performance of this technique in primary molars, and its application is reserved for high risk conditions<sup>6</sup>.

In this sense, the objective of this systematic review was to answer the following question, formulated through the PICO (Population, Intervention, Comparison, Outcome) strategy: Does the application of pit and fissure sealants in the primary dentition contribute effectively to the prevention of dental caries in primary molars compared to the non-application of this measure or with the application of other preventive methods? Additionally, it was tried to understand the success rates inherent to the retention of sealants in the primary dentition facing the limitations pointed out in the literature related to their application in this specific dentition.

### METHODS

Bibliographic research of scientific articles published between 2005 and 2020 in the electronic databases PubMed, B-On, Cochrane Library and ScienceDirect, using the following research terms: pit and fissure sealants; primary teeth; primary molars; dental caries; prevention and retention, which were articulated and combined through the Boolean AND marker. The methodological line followed for the selection of articles to be included in this systematic review is presented in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram. Articles in the form of clinical trials, randomized controlled trials, cohort studies and case-control studies were included, conducted in children with primary dentition and whose dental outcome was assessed: the development of dental caries and/or, the rate of retention of pit and fissure sealants in the primary dentition comparing the results of the intervention (application of sealants in primary molars) with the absence of sealant or with the application of other preventive measures. Data were collected and analyzed by two researchers. The methodological quality assessment of the included articles was performed with tools developed and validated for this purpose: for clinical trials and randomized controlled clinical trials was used the Cochrane tool and, for the cohort study, was used the Newcastle-Ottawa scale. In general, the clinical trials included in this systematic review have high methodological quality.

### RESULTS

#### Development of dental caries:

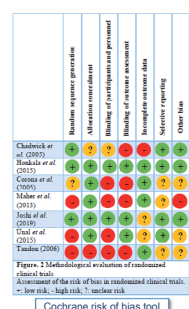
- Chadwick et al. (2005)** • Group with sealants had a lower incidence of caries compared to the group without crack sealants<sup>1</sup>
- Honkala et al. (2015)** • Fluoride varnishes presented a 3 times higher risk of developing caries lesions compared to pit and fissure sealants<sup>3</sup>
- Joshi et al. (2019)** • Caries incidence was higher in the group without sealant, compared to the group with sealants<sup>5</sup>
- Hong et al. (2019)** • Application of pit and fissure sealants proved to be a protective factor for the development of dental caries<sup>4</sup>

#### Retention of pit and fissure sealants:

- Corona et al. (2005)** • Flow system showed a higher retention rate compared to conventional resin sealant<sup>2</sup>
- Ünal et al. (2015)** • Aegis® > Heliouseal® > Heliouseal F®<sup>10</sup>
- Maher et al. (2013)** • Higher retention rate with conventional orthophosphoric acid technique
- Maher et al. (2013)** • Total loss rate was higher with the self-etch technique
- Maher et al. (2013)** • Self-etch technique does not compromise the retention rate of sealants<sup>7</sup>
- Joshi et al. (2019)** • In long-term, an additional cycle of light curing contributes to greater retention of sealants<sup>5</sup>
- Tandon (2006)** • Glass ionomer sealant showed greater loss of complete retention<sup>9</sup>

#### Assessment of the risk of bias:

Author (year)	Representativeness of the exposed cohort (1)	Selection of the exposed cohort (2)	Ascertainment of exposure (3)	Demographic characteristics that are not related to the exposure (4)	Comparability of outcomes (5)	Assessment of outcome (6)	Blinding of outcome assessment (7)	Accuracy of outcome (8)	Score
Wong et al. (2016)	+	+	+	+	+	+	+	+	1/9



Wells et al., 2019; Higgins et al., 2011

### DISCUSSION

Through the scientific literature consulted for the achievement of this systematic review, it was possible to verify that the application of pit and fissure sealants is an effective measure for the prevention of caries in primary dentition. The retention rate of sealants was also evaluated, and it was demonstrated that, regardless of the anatomical and morphological differences between permanent and primary dentition, the latter being less prominent and less retentive, the truth is that in the follow-up periods considered, sealants maintained their retentive capacity, contributing to the success of the application of this preventive method in the deciduous molars.

In another clinical trial, conducted on permanent teeth by Ratnadiya and collaborators, the retention rate was compared between a hydrophobic fissure sealant and a hydrophilic resin sealant, and the hydrophilic sealant presented a higher total retention rate. In this sense, the authors report that hydrophilic sealant can be used effectively in children at high risk of caries, hypersalivation, very young and non-collaborative children, children with mental and physical problems and partially erupted teeth, revealing that this type of sealants can be included in a community health program, showing that, currently, there are sealants available, capable of responding to some of the identified problems.

Although the results of the included articles demonstrate the efficacy of the application of pit and fissure sealants in the prevention of dental caries in primary dentition, it is necessary to conduct clinical trials with stricter methodologies in order to be able to prove, unequivocally, the advantage of the application of this preventive technique in primary dentition.

### CONCLUSION

There is scientific evidence that demonstrates that the application of pit and fissure sealants in primary molars is an effective method in the prevention of dental caries.

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