

# EFFECTIVENESS OF SCHOOL-BASED PIT AND FISSURE SEALANT PROGRAMS IN DENTAL CARIES PREVENTION: A SYSTEMATIC REVIEW.

## INTRODUCTION

- Dental caries is an important non-communicable disease (NCDs) affecting a significant proportion of the population in the world, particularly young children.<sup>1</sup>
- Various public health measures such as using fluorides in both topical as well as systemic forms is employed in many parts of the world to prevent dental caries.<sup>2</sup>
- Despite the use of fluorides, the permanent molars are still susceptible to dental caries, and hence additional preventive programs are essential.<sup>3</sup>
- Among school-aged children, the majority of the increment in dental caries has been detected on pit and fissure surfaces of first and second molars.<sup>4</sup>
- In children or teeth susceptible to caries, pit and fissure sealants can be used as a preventive measure to prevent dental caries.<sup>5</sup>
- School-based pit and fissure sealant programs are one such public health initiative to prevent dental caries in molars.<sup>6</sup>
- The effectiveness of school-based pit and fissure sealant programs in preventing caries among young children has not been well documented, and hence the present systematic review was undertaken.

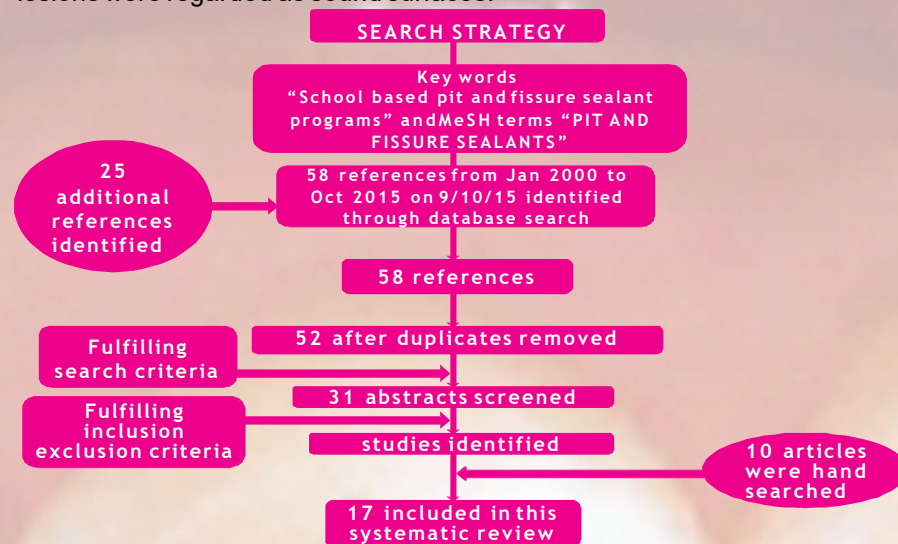


## AIM & OBJECTIVES

- To investigate the effectiveness of school-based pit and fissure sealant programs in the prevention of dental caries in children.
- To document and report on data concerning the retention of sealants.
- To assess cost effectiveness of various school or community-based pit and fissure programs.
- To find out whether school-based pit and fissure sealant programs are implementable in India.

## MATERIAL & METHODS

- A systematic literature survey carried out in October 2015 using electronic data bases such as PubMed, PubMed central and Google Scholar
- Criteria for considering studies for this review:**
- Types of studies:** Randomised of at least 12 months in duration included. The unit of randomisation could be individual, group (school, school class, etc.), tooth or tooth pair.
- Types of participants:** Children and adolescents under 20 years of age from the general population.
- Types of interventions:** Studies concerned with comparing children with sealant to a control group without sealant. Studies where fissure sealants were used concurrently with fillings were excluded.
- Types of outcome measures:** Incidence of caries expressed in terms of caries or no caries on occlusal surfaces of permanent molar teeth. Caries was defined as caries in dentine. Enamel lesions were regarded as sound surfaces.



## RESULTS

**Table 1: Effectiveness of school-based pit and fissure sealant application in the prevention of dental caries**

S. NO.	Author's Name	Study setting	Prevention of dental caries after sealant application	Odd's Ratio Sealed	Odd's Ratio Unsealed
1	Dennison JB etal(2000) <sup>7</sup>	Michigan	93.5%		
2	Wendt LK etal(2001) <sup>8</sup>	Sweden	78%		
3	Parnell CA etal(2003) <sup>9</sup>	Ireland	97.1%		
4	Wyk P etal(2004) <sup>10</sup>	South Africa	=50%		
5	Armfield JM etal(2007) <sup>2</sup>	Australia	50%		
6	Tai B etal(2009) <sup>11</sup>	China	26.1%		
7	Memarpour M etal(2011) <sup>12</sup>	Iran	77.1%		
8	Oulis CJ etal(2011) <sup>13</sup>	Greece	24%	0.65-1.22	0.57-1.00
9	Baldini V etal(2011) <sup>14</sup>	Portugal	86.4%	1	1.81
10	Muller Bolla etal(2013) <sup>6</sup>	France	74%	0.27 (0.14-0.50)	1
11	Phipps etal(2013) <sup>15</sup>	Alaska	62.4%		

**Table 2: Cost effectiveness of school-based pit and fissure sealant programs**

S. No.	Author's Name	Setting	Findings
1	Wemer CW etal(2000) <sup>16</sup>	Brazil	Cost of saving single teeth from decay within a 6yr period at school was estimated to be \$65 & \$42, with avg surface sealing time per tooth surface 18 & 12.5 minutes respectively.
2	Schrer CR etal(2007) <sup>17</sup>	US	Cost savings for adding an assistant and dental chair over all of program sizes & travel distances ranges from 4.50% to 10.94%.
3	Baillit etal(2008) <sup>18</sup>	US	The program is financially feasible in states where the ratio of Medicaid fees is 60.5% of mean national fees
4	Sakuma S etal(2010) <sup>3</sup>	Japan	Cost benefit ratio: For 8yr olds - 1.84. For 11yr olds - 2.42

**Table 3: Retention of pit & fissure sealants**

S. No.	Author's name	Study setting	% of completely retained sealant	Follow-up at
1	Parnell CA etal (2003) <sup>9</sup>	Ireland	56%	3yr
2	Tai B etal (2009) <sup>11</sup>	China	17.5%	3yr
3	Devlin D etal (2011) <sup>19</sup>	Massachusetts	54%	6yr
4	Memarpour M etal(2011) <sup>12</sup>	Iran	57.5%	1.5yr
5	Muller Bolla etal(2013) <sup>6</sup>	France	52.7%	1yr
6	Rafatjou R etal (2013) <sup>20</sup>	Iran	68.6%	1yr

## DISCUSSION

- Dental caries is an important public health problem in the world, particularly in the developing and under-developed countries. Even though there is decline in dental caries in the world, largely due to use of fluorides, caries still affects 60-90% of children through out the world.<sup>21</sup>
- Results of this systematic review revealed that school-based pit and fissure sealant programs are effective in preventing dental caries in young children. The prevention ranged from 24% to 97.1% when compared to unsealed groups.<sup>9,13</sup> School-based pit and fissure sealant programs are effective when targeted toward high risk individuals, who are 8 to 10 times more likely to develop dental caries than low risk children.<sup>13</sup>
- The concept of a WHO health-promoting school project can be incorporated along with "School-based pit and fissure sealant programs" for promotion of oral health.<sup>22</sup>
- A significant correlation has been found between sealant retention and its caries preventive effect; although sealant retention rates decline to 85% after 1 year and to 50% after 5 years.<sup>20</sup>
- The present study revealed that a community-based pit and fissure sealant program is cost effective, with a cost-benefit ratio 1.84.<sup>3</sup> Even though school-based pit and fissure sealant programs are effective, their implementation depends upon manpower, infrastructure, budgets with active community support, stake holders in government, NGOs and individual charities.
- School/community-based pit and fissure sealant programs are not feasible in India due to lack of budget and active support from government agencies. However, it could be implemented if resources were available.<sup>18</sup>

## CONCLUSIONS

- School-based pit and fissure sealant programs result in a significant reduction of dental caries and may be economically viable as the cost benefit ratio is high.
- Similar programs could be implemented in India if resources were available. The need should be ascertained before implementation.

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