Proceedings of the International Conference on Public Health, Vol. 7, Issue 2, 2022, pp. 66-74

ISSN 2424 – 6735 online
DOI: https://doi.org/10.17501/24246735.2022.7207

PUBLIC HEALTH INTERVENTIONS FOR ORAL HEALTH IN RURAL SCHOOLS IN SRI LANKA

Gajanayake C*

National Hospital, Colombo, Sri Lanka

Abstract: Dental caries and periodontal disease are common among the school children in rural areas. It is highly prevalent and become a "silent epidemic". According to national oral health survey 2002-2003, 39.17% of 12 years have caries and in rural area it is 40.68%. In the fight against dental caries Ministry of health has introduced "Save the Molar" project where fissure sealant is applied in schoolchildren by school dental therapists. As fissure sealant was a new introduction to the government system, the study aims to assess the retention of fissure sealant applied by SDT. Six SDT were selected from a rural district in Sri Lanka and they were trained for 2 days on selection of children and application of glass ionomer fissure sealant. Three of them had applied glass iomoner based fissure sealant in a mobile setup while the other three had applied the same fissure sealant in the school dental clinics. After a period of six months, the fissure sealants were reviewed to see whether they are fully intact, broken or completely dislodged. All the children were between ages 9-11.76.84% of the fissure sealant was present in the molar teeth after six months and 11.33% were broken and 11.82% were and completely dislodged from the teeth. In clinic setup 75.61% fully intact fissure sealant while 12.68% and11.70% were broken or completely dislodged respectively. However, in mobile setup results were much better, 79% of the fissure sealants were intact while 8.95% and 11.94% are either broken or dislodged respectively.This study shows no much difference in retention of glass ionomer fissure sealant applied in clinic setup and mobile setup. Overall retention percentages are high.

Keywords: dental caries, rural school

Introduction

Background

Dental caries has become a major public health problem globally due to its high prevalence particularly in Asian and Latin American countries. Dental caries is a disease of rich and urban population, because of their extensive use of sugar and refined carbohydrates. However, the picture is changing, consumption of sugar and refined carbohydrates are not a luxury anymore. More and more people from the rural are changing their dietary pattern and consume more sugar[1]. In the developed countries, decline in dental caries prevalence has been attributed to population-based preventive programmes with use of fluoride, improved participation in oral health programmes and changes in oral hygiene and sugar intake habits. On the other hand, in many developing countries an increase in dental caries has resulted from unhealthy dietary habits, limited use of fluoride and poor access to oral

*Corresponding Author's Email:*drchandanagajanayake@gmail.com

health services[2]. In many developing countries, most oral health services provide symptomatic treatment with little priority given to restoration and prevention. Dental caries affects 60-90% of schoolchildren in most developing countries and the prevalence rates are increasing. Twelve-year-olds represent as standard age category used by the WHO to assess and compare dental caries levels in the permanent dentition of children worldwide.

School oral health service in Sri Lanka is an important discipline because it contributes to improving the oral health status of Sri Lankans that results in a reduction of the colossal dental care cost of the health budget[3]. Fluoridation of drinking water has become one of the most important and favored methods for control of caries in smooth and proximal surfaces of teeth. Sealant placement is considered as an effective treatment modality for prevention of caries in occlusal pits and fissures. The school dental service in Sri Lanka is carried out by both school dental therapists as well as dental surgeons in preschool children as well as children of all school-going ages[4]. Oral health problems are of multi-factorial etiology with great impact of socio behavioural and environmental factors [5]. Previous studies conducted in Sri Lanka stated that birth rank, family size, gender and income of the family are important determinants of various aspects of oral health and rural areas have poor oral health status than urban areas[6]. Unlike developed countries, Sri Lanka does not have appropriate numbers of dental surgeons for its population and neither a fair distribution of dental surgeons. As a result of these rural areas are most affected. Aggravating this there is a shortage of dental ancillary personnel to carry out preventive care and health promotion.

In several high-income countries with preventive oral care programmes, the prevalence of dental caries in children and tooth loss among adults has dropped remarkably[7]. In most low- and middle-income countries, the general population does not benefit from systematic oral healthcare. In some countries, the incidence of dental caries has increased over recent years due to the growing consumption of sugars and inadequate exposure to fluorides [5]. Oral disease is one of the most expensive diseases to treat. In high-income countries, the burden has been tackled with the establishment of advanced oral-health systems. Pit and fissure sealant is a resin or GIC material that is introduced into the occlusal pits and fissures of caries-susceptible teeth for the purpose of acting as a physical protective barrier against caries-producing bacteria entering in the tooth crevices. It has been well documented in the literature that occlusal surfaces in young patients have high caries susceptibility[8]. Pits and fissures of posterior molar teeth are considered highly susceptible to the adhesion of microorganisms. As a result, a significant amount of tooth decay occurs at these sites. Fissure sealants are believed to prevent occlusal caries by 71% after a once-off fissure sealant application[9]. The most commonly used sealant materials are resin or glass ionomar cement Its caries-preventive effect relies on the sealing of pits and fissures through micro-retention, created through tags after acid etching of enamel [10].

Objective

To measure the effectiveness of applying fissure sealant by school dental therapists in a rural district in Sri Lanka.

Method

Plan of implementation

The pilot project was carried out in four phases.

Phase one - Selection of Districts and SDT (School dental Therapists)

Phase two - Training of selected SDT

Phase three - Application of fissure sealant in children in Mobile and Clinic setups.

Phase four -Review and follow up

Six School Dental Therapists were randomly chosen for the project. As this was a voluntary process, they were asked whether they were willing to participate in the project. All who got selected were willing to participate in the project. The selected SDTs were trained in the regional government training center. Fissure sealant was applied in the selected school dental clinics and mobile dental clinics by school dental therapists. According to the ministry guidelines, children aged 7-9 years with deep fissures and with at least one carious tooth were selected.

Procedure

The occlusal surfaces of the teeth were cleansed with water/pumice slurry using brushes at low speed. The remains of the polishing paste was washed with water. Then the teeth were dried gently. Next, dentine conditioner was applied to pits and fissures to be sealed. After waiting 20 seconds the conditioner was washed with water. After this, the fissure sealant was applied on the fissure and left there for 15 seconds. The sealant was handled according to manufacturer's instructions.

SDT has kept the records of the children who underwent fissure sealant application. After six months, those children were recalled and the status of each fissure sealant was measured, whether the fissure sealant was intact, broken (partially intact) or completely dislodged (removed).

All patients and their parents/guardians were educated and informed about the possible advantages and the risks of using fissure sealants. Additionally the procedure and the steps also explained. All the participants were selected from schools and on voluntary basis.

Results

Out of the 151 teeth filled, 101 were filled in the clinic setup while 50 teeth were filled in mobile setup. 78 of the teeth were upper molar teeth while 73 teeth were lower molar teeth.

Table 1: Census of the retention of fissure sealant after 6 months

Retained	Broken	Dislodged	Teeth
118	28	05	151

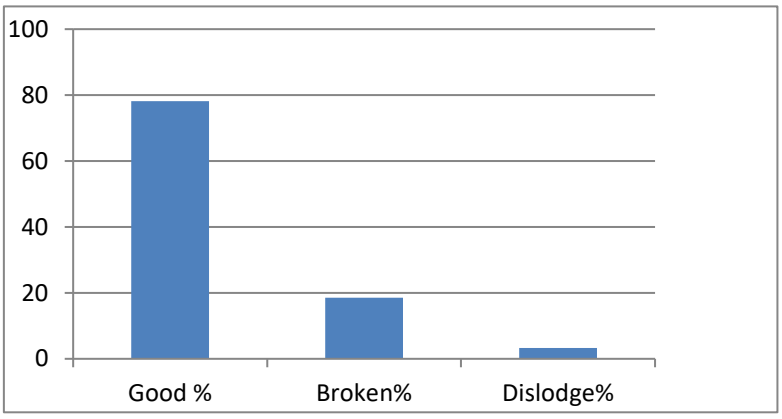
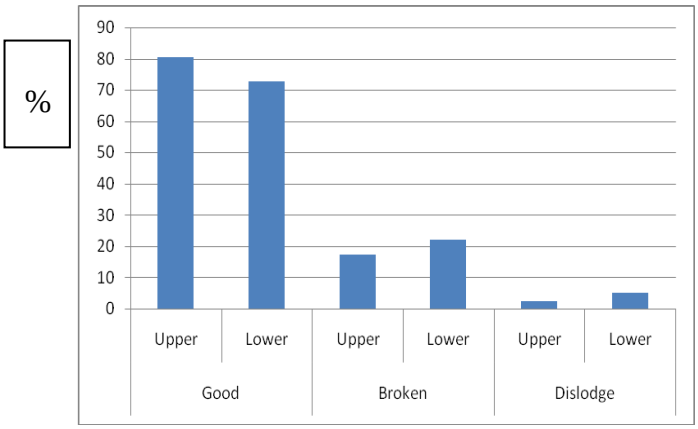


Figure 1: Retention of fissure sealants

Fissure Sealant		
Good %	Broken%	Dislodge%
78.15	18.54	3.31

2. Retention level according to the upper and lower teeth



Good		Broken		Dislodge	
Upper	Lower	Upper	Lower	Upper	Lower
80.45	72.84	17.2727	21.98	2.27	5.17

Upper teeth showed a slightly higher rate of retention than the lower teeth.

Discussion

Effectiveness of fissure sealants

During the project, 151 teeth were applied with fissure sealant. In mobile setup, fifty teeth were applied while 101 teeth were applied in clinic. Out of the 151 teeth applied with fissure sealant, 78 were upper teeth and 73 were lower teeth. Therefore, the population is slightly skewed to the upper teeth.

Fissure sealants have been used as a treatment procedure in the fight against dental caries. This has been used in many different countries over thirty years. Dental caries takes about several months to couple of years to develop. Fissure sealants act as a protective physical barrier between tooth surface and the acidic environment of microbial flora (bio film). Additionally, glass ionomar cements has the fluoride releasing ability which will slow down the microbial proliferation and strengthen the remineralizing process. Therefore, if the sealants are present in the teeth it will resist caries effectively.

Retention of fissure sealants

One hundred and fifty one teeth were applied with fissure sealant. After six months, 78.15% of those teeth showed fully retained fissure sealants. In contrast to this, Ulusu et al in 2012 conducted a study in Europe and found that retention rates of glass iomomer sealant was 13.8% after 24 months.

These results show that there is a small deference in results of the two settings. Fissure sealant application does not need much sophisticated equipment; it requires only few simple equipment. Those minimal facilities available in a mobile setup might be sufficient to do a satisfactory fissure sealant application. This may be the reason for the small difference observed in this research. This project measured the retention of Glass Ionomer based fissure sealants over a period of six months. In comparison with some of the published data, retention levels were better than those results of the developing and middle-income countries [11]. However, some studies done in developed countries show better retention rate[12].

Conclusion

This project was conducted in a rural setting of the country. The project was aimed to identify the effectiveness of application of fissure sealants by SDTs and retention of those sealants in children's teeth. Fissure sealants were applied by SDTs. The two settings were chosen to represent the clinical and mobile settings of practice of SDTs. This selection helped to generalize the findings to the normal SDT work plan. Another important finding was that there was no marked difference in longevity of

GIC based fissure sealant retention in clinic and mobile settings. Additionally, the retention levels of upper and lower teeth were compared. Study reveals that the teeth in upper arch had a superior retention rate than the teeth in the lower arch.

Recommendations

More training and more facilities given to control moisture (rubber dam and suction apparatus) would improve the retention levels. It is more difficult to control the moisture and saliva contamination in the lower arch. Provision of moisture control equipment will improve the retention levels of the lower teeth.

In mobile settings, the wastage is more. As there is limited illumination and logistic facilities in a mobile setting; the assistant may tend to mix more material leading to wastage. Additionally, some material is wasted due to saliva contamination. Provision of better facilities to mobile settings, such as portable lights and sucker/ saliva ejectors will improve the efficiency of fissure sealant usage in mobile settings.

Due to the high retention rates achieved and relatively low material cost incurred, fissure sealant application by SDTs can be recommended as a preventive programme for the Ministry of Health. However, continuous training for the SDTs will improve the uniformity and retention levels.

References

[1]L. Prasai Dixit, A. Shakya, M. Shrestha, and A. Shrestha, “Dental caries prevalence, oral health knowledge and practice among indigenous Chepang school children of Nepal,” BMC Oral Health, vol. 13, no. 1, pp. 1–5, 2013, doi: 10.1186/1472-6831-13-20.

[2]M. F. A. Quadri et al., “No 主観的健康感を中心とした在宅高齢者における健康関連指標に関する共分散構造分析Title,” Community Dent. Oral Epidemiol., vol. 16, no. 1, pp. 453–460, 2020, doi: 10.1922/CDH.

[3]O. Basnayake, “School Dental Therapists’ Services in Sri Lanka: An overview,” Int. J. Sci. Res. Publ., vol. 11, no. 6, pp. 687–691, 2021, doi: 10.29322/ijsrp.11.06.2021.p11489.

[4]O. Basnayake and I. Perera, “Oral Health: A Review through Eyes of Sri Lanka,” Int. J. Sci. Res. Publ., vol. 11, no. 4, pp. 508–511, 2021, doi: 10.29322/ijsrp.11.04.2021.p11268.

[5]P. E. Petersen, D. Bourgeois, H. Ogawa, S. Estupinan-Day, and C. Ndiaye, “The global burden of oral diseases and risks to oral health,” Bull. World Health Organ., vol. 83, no. 9, pp. 661–669, 2005, doi: /S0042-96862005000900011.

[6]V. Nanayakkara, A. Renzaho, B. Oldenburg, and L. Ekanayake, “Ethnic and socio-economic disparities in oral health outcomes and quality of life among Sri Lankan preschoolers: A cross-sectional study,” Int. J. Equity Health, vol. 12, no. 1, pp. 1–9, 2013, doi: 10.1186/1475-9276-12-89.

[7]P. Ramamurthy et al., “Sealants for preventing dental caries in primary teeth,” Cochrane Database Syst. Rev., vol. 2022, no. 2, 2022, doi: 10.1002/14651858.CD012981.pub2.

[8]B. John Rozar Raj, S. R. Srinivasan, and M. S. Niveditha, “The use of pit and fissure sealant among adult population - a retrospective study,” Eur. J. Mol. Clin. Med., vol. 7, no. 1, pp. 1926–1932, 2020, [Online]. Available: https://www.embase.com/search/results?subaction=viewrecord&id=L2010164785&from=export

[9]J. E. Frencken, M. C. Peters, D. J. Manton, S. C. Leal, V. V. Gordan, and E. Eden, “Minimal intervention dentistry for managing dental caries - A review: Report of a FDI task group,” Int. Dent. J., vol. 62, no. 5, pp. 223–243, 2012, doi: 10.1111/idj.12007.

[10]R. Naaman, A. A. El-Housseiny, and N. Alamoudi, "The use of pit and fissure sealants-a literature review," Dent. J., vol. 5, no. 4, pp. 1–19, 2017, doi: 10.3390/dj5040034.

[11]S. Tianviwat, "Comparative School Dental Sealant Program to Alleviate Dental Caries Problem — Thai versus International Perspective," Emerg. Trends Oral Heal. Sci. Dent., 2015, doi: 10.5772/59516.

[12]L. B. Messer, H. Calache, and M. V. Morgan, "The retention of pit and fissure sealants placed in primary school children by Dental Health Services, Victoria," Aust. Dent. J., vol. 42, no. 4, pp. 233–239, 1997, doi: 10.1111/j.1834-7819.1997.tb00127.x.