



MOH/K/GIG/1.2020(GU)

## **GUIDELINES**

# **CLINICAL PREVENTION PROGRAMME FOR CARIES**

**ORAL HEALTH PROGRAMME  
MINISTRY OF HEALTH MALAYSIA  
2020**



**FOREWORD BY  
THE PRINCIPAL DIRECTOR OF ORAL HEALTH  
MINISTRY OF HEALTH MALAYSIA**

Oral health has improved tremendously over the last century but the prevalence of dental caries in children remains a significant public health issue worldwide. In Malaysia, the recent oral health data from the National Oral Health Survey of Schoolchildren 2017 shows a decreasing trend in the prevalence of dental caries among 12-year-old schoolchildren. However, the study showed a high need for preventive caries-arresting care and fissure sealant among schoolchildren. The Health Information Management System 2018 also documented a high number of carious teeth with occlusal caries involvement in the 12-year-old schoolchildren.

The evaluation of occlusal caries trend over the years in addition to the increasing need of preventive care supports the continuation and strengthening of clinical prevention programme for caries. Therefore, this guideline is developed to incorporate the Modified MOH ICDAS and Caries Risk Assessment to manage early caries lesions for preschool and schoolchildren. This approach provides a framework to support and enable personalized total caries management for improved long-term oral health outcomes through preventively orientated management of caries.

Alongside this, further focus will be on Fissure Sealant, Fluoride Varnish and Preventive Resin Restoration Type 1 as the clinical preventive measures in Incremental Dental Care. This guideline will be useful as a guide for oral health personnel to implement, monitor and evaluate the Clinical Prevention Programme For Caries for preschool and schoolchildren in Malaysia.

I take this opportunity to extend my warm appreciation for the commendable effort of the committee involved in the preparation of this manual and also to all officers who contributed in one way or another. It is hoped that with the adoption of this programme, it will translate into further caries decline in Malaysia.

A handwritten signature in black ink, appearing to read 'D. J. J.', with a stylized flourish at the end.

**Dr Doreyat Bin Jemun**  
Principal Director (Oral Health)  
Ministry of Health Malaysia

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### THE WORKING COMMITTEE

**Advisor** Dr Doreyat Bin Jemun  
Principal Director of Oral Health  
Ministry of Health Malaysia

**Chairman** Dr Chia Jit Chie  
Director of Oral Health Care Division  
Oral Health Programme  
Ministry of Health Malaysia

#### Members

Dr Cheng Lai Choo  
Deputy Director  
Oral Health Programme  
Ministry of Health Malaysia

Dr Salleh Bin Zakaria  
Deputy Director  
Oral Health Programme  
Ministry of Health Malaysia

Dr Amdah Bt Mat  
Deputy Director  
Oral Health Programme  
Ministry of Health Malaysia

Dr Nooraini Bt Osman  
Deputy Director  
Oral Health Department WPKL/Putrajaya

Dr Mustaffa Bin Jaapar  
Senior Principal Assistant Director  
Oral Health Programme  
Ministry of Health Malaysia

Dr Zurina Asiah Bt Musa  
Senior Principal Assistant Director  
Oral Health Programme  
Ministry of Health Malaysia

Dr Misah Bt Md Ramli  
District Dental Officer  
Petaling, Selangor

Dr Muhammad Zulkefli Bin Ramlay  
District Dental Officer  
Kuala Pilah, Negeri Sembilan

Dr Nurul Ashikin Bt Husin  
District Dental Officer  
Melaka Tengah, Melaka

Dr Wan Salina bt Wan Sulaiman  
Senior Principal Assistant Director  
Oral Health Department Kelantan

Dr Susan Shalani a/p Ganapragasam  
Formerly Principal Assistant Director  
Oral Health Programme  
Ministry of Health Malaysia

Pn. Jeyandra Gandhi a/p Chelliah  
Supervisor Dental Therapist  
Oral Health Programme  
Ministry of Health Malaysia

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## 1. INTRODUCTION

Recent oral health data of schoolchildren in Malaysia shows a decreasing trend in the prevalence of dental caries among schoolchildren over the last two decades. In National Oral Health Survey of Schoolchildren (NOHSS) 2017<sup>1</sup>, 33.3% of 12-year-old experience dental caries as compared to 41.5% in 2007<sup>2</sup> and 60.9% in 1997<sup>3</sup>. The mean DMFT of 12-year-old also shows a decreasing trend over the last two decades, with the mean DMFT of 1.9 in 1997<sup>3</sup>, 1.12 in 2007<sup>2</sup> and 0.78 in 2017<sup>1</sup>. However, the caries reduction rate was lower from 2007<sup>2</sup> to 2017<sup>1</sup> (19.8%) compared from 1997<sup>3</sup> to 2007<sup>2</sup> (31.9%).

The decline in caries prevalence and experience is also found among the 16-year-old schoolchildren. Caries prevalence of 16-year-old schoolchildren has declined from 75.5% in 1997<sup>3</sup> to 59.6% in 2007<sup>2</sup>. The mean DMFT has declined from 3.3 in 1997<sup>3</sup> to 2.1 in 2007<sup>2</sup>. However, the decline in caries prevalence and experience were less for the 6-year-old. Caries prevalence has only declined to 74.5% in 2007<sup>2</sup> from 80.9% in 1997<sup>3</sup> while the mean dft has declined to 3.6 (2007)<sup>2</sup> from 4.1 in 1997<sup>3</sup>. The current National Oral Health Survey for Preschool Children (NOHPS, 2015) showed the caries prevalence for 5-year-old to be still high at 71.3% and mean dft to be 4.8<sup>4</sup>.

Due to declining trends of caries prevalence and experience amongst the 12-year-old schoolchildren, the caries treatment needs had increased by only about 2% over the last decades, from 30.9% in 2007<sup>2</sup> to 32.9% in 2017<sup>1</sup>. However, the present study<sup>1</sup> showed a high need for preventive care (22.9%) among 12-year-old schoolchildren, followed by restorative treatment (14.8%), extraction (1.8%) and complex care (1.0%). The need for preventive caries-arresting care and fissure sealants was increased by two-fold from 11.5% in 2007 to 22.9% in 2017. A total of 7.6% of 12-year-old schoolchildren need caries-arresting care in 2017

<sup>1</sup> Oral Health Division, Ministry of Health Malaysia. National Health and Morbidity Survey 2017: National Oral Health Survey of Schoolchildren 2017 (NHMS 2017: NOHSS 2017). Vol. II: Oral Health Status of 12-year-old Schoolchildren. September 2017.

<sup>2</sup> Oral Health Division, Ministry of Health Malaysia. National Oral Health Survey of School Children 2007 (NOHSS 2007): 12-Year-Olds. MOH/K/GIG/23.2010 (RR), August 2010.

<sup>3</sup> Oral Health Division, Ministry of Health Malaysia. National Oral Health Survey of School Children 1997 (NOHSS' 97). MOH/GIG/6.98 (RR), 1998.

<sup>4</sup> Oral Health Division, Ministry of Health Malaysia. National Oral Health Survey of Preschool Children (NOHPS), 2015

while only 1.5% in 2007. As for fissure sealant, 17.4% of 12-year-old schoolchildren need fissure sealant in 2017, as compared to only 10.8% in 2007.

### 1.1 Level of Caries Prevention

Caries prevention can be categorized into three levels namely primary, secondary and tertiary level<sup>5</sup>. The primary level prevention aimed to modify and correcting factors to favor the oral health. Secondary prevention will limit the impact of caries at an early stage as long as possible after onset. It focuses on the minimally invasive and tissue preserving approach<sup>6</sup>. Tertiary prevention is the rehabilitation of the decayed teeth with further preventive care with the aim to limit the extent of disability once a disease has caused some functional limitation. Thus, Clinical Prevention Programme for Caries (CPPC) namely Fissure Sealant (FS), Fluoride Varnish (FV) application and Preventive Resin Restoration (PRR) Type 1 can be grouped under secondary prevention.

### 1.2 Modified MOH ICDAS

In line with Malaysia Strategic Thrust for Oral Health on Disease Prevention, an agreement from the Oral Health Programme, Ministry of Health (MOH) Malaysia to use International Caries Detection and Assessment System (ICDAS) in the Oral Health Programme of the MOH was forged in October 2013 during a seminar and workshop on ICDAS with Professor Nigel Pitts, one of the founding members of ICDAS.

The National Task Force for ICDAS in Malaysia convened in December 2013 and the future direction of ICDAS was charted, involving the Oral Health Programme, the Dental Services Malaysia Armed Forces and the academia. Following this, a task force was set up at the Oral Health Programme to look into incorporating the early caries detection component of ICDAS in the primary oral healthcare programme of the MOH. The Modified MOH ICDAS (MMI) was approved for use at *Mesyuarat Halatuju Kesihatan Pergigian* on 10 March 2016<sup>7</sup>.

<sup>5</sup> Scottish Intercollegiate Guideline Network (SIGN). 2000. Preventing Dental caries in Children at High Caries Risk, Targeted prevention of dental caries in the permanent teeth of 6-16 year olds presenting for dental care.

<sup>6</sup> Selwitz RH, Ismail AI & Pitts, N.B. 2007. Dental Caries. *The Lancet*, 369, 51-59.

<sup>7</sup> Oral Health Division, Ministry of Health Malaysia. Operational Manual: Pilot Implementation of Early Caries Detection and Management in the Oral Health Programme, May 2016.



The MMI was devised with the modification of ICDAS codes for detection of early caries. A new code for initial caries, E was introduced in this system in which it represents the combination of ICDAS caries code 1, 2, 3 and fissure status.

The criteria for code E were; a) first visual change in enamel, b) distinct visual change in enamel, c) localised enamel breakdown but without dentine involvement, and d) presence of deep and/or complex pattern(s) of pits and fissures. Based on clinical judgement, preventive procedures undertaken can be either fissure sealant, fluoride varnish application or preventive resin restoration Type 1.

In the context of the Malaysian school dental programme, these preventive procedures are considered as non-invasive and can be counted as 'No Treatment Required (NTR)' cases. In 2015, a pilot study on the use of MMI in primary schools in Wilayah Persekutuan Kuala Lumpur showed about one third (37.1%) of primary schoolchildren had early caries lesions while 36.3% of caries-free children had early caries lesions.

### 1.3 Fissure Sealant

Fissure Sealant is defined as a material that is placed in the pits and fissures of teeth in order to prevent or control the development of dental caries. Fissure Sealant plays an important role in caries prevention because they can protect caries-susceptible pits and fissures that are least protected by fluoride. Pits and fissures are surfaces most prone to dental caries due to morphological characteristics when compared to other tooth surfaces. There are strong evidence of effectiveness of fissure sealants in preventing dental caries in children and adolescents<sup>8,9,10,11,12</sup>. The effectiveness of fissure sealants was evaluated mainly

<sup>8</sup> Truman BI, Gooch BF, Sulemana I, et al; Task Force on Community Preventive Services. Reviews of evidence on interventions To prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries. *Am J Prev Med* 2002;23(1 suppl):21-54

<sup>9</sup> Azarpazhooh A, Main PA. Pit and fissure sealants in the prevention of dental caries in children and adolescents: a systematic review. *J Can Dent Assoc*. 2008 Mar;74(2):171-7. Review.

<sup>10</sup> Ahovuo-Saloranta A, Hiiri A, Nordblad A, Mäkelä M, Worthington HV. Pit and fissure sealants for preventing dental decay in the permanent teeth of children and adolescents. *Cochrane Database of Systematic Reviews* 2008, Issue 3. Art. No.: CD001830. DOI: 10.1002/14651858.CD001830.pub3. This version first published online: Oct 8, 2008. Last assessed as up-to-date: August 03, 2008.

<sup>11</sup> Griffin SO, Oong E, Kohn W, Vidakovic B, Gooch BF; CDC Dental Sealant Systematic Review Work Group, Bader J, Clarkson J, Fontana MR, Meyer DM, Rozier RG, Weintraub JA, Zero DT. The effectiveness of sealants in managing caries lesions. *J Dent Res*. 2008;87(2):169-74.

<sup>12</sup> Ahovuo-Saloranta A, Forss H, Walsh T, Hiiri A, Nordblad A, Mäkelä M, Worthington HV. Sealants for preventing dental decay in The permanent teeth. *Cochrane Database Syst Rev*. 2013 Mar 28;3:CD001830. doi: 10.1002/14651858.CD001830.pub4.

based on retention rate of sealants and caries outcome of the sealed teeth, refer **Appendix 1**<sup>13,14,15,16</sup>.

#### 1.4 Preventive Resin Restoration

In minimally invasive approach, caries is deferred operative intervention as long as possible<sup>17</sup>. The focus is on maximum conservation of demineralized enamel and dentine. Once control of the infection is achieved, the patient's caries risk status and evidence of lesion demineralization can be monitored over extended periods<sup>18,19,20</sup>. Preventive Resin Restoration utilizes invasive and non-invasive treatment of borderline or questionable caries. Resin is placed in the carious areas and adjacent caries susceptible area, and the remaining pits and fissures are protected with sealants. PRR is divided into three types, depending on the extent of the lesion. In school dental service, PRR Type I is the preventive treatment for tooth surfaces coded 'E' (caries lesion confines to enamel layer in pits and fissures), in which fissure sealant materials will be used and the tooth is still considered sound (code 0). However, if lesion is found to have extended into dentine, PRR Type II or III will be placed depending on the extend of caries in dentine. The cavity will be treated with composite resin and sealant materials and the tooth will then be charted as filled.

#### 1.5 Fluoride Varnish

A systematic review<sup>21,22</sup> concluded that the benefits of topical fluorides are firmly established based on a sizeable body of evidence from randomized controlled

<sup>13</sup> Ripa LW. The current status of pits and fissure sealants. A review. *J Can Dent Assoc* 1985; 51: 367-380.

<sup>14</sup> Weintraub JA. The effectiveness of pit and fissure sealants. *J Public Health Dent* 1989; 49(5) Spec Iss: 317-327.

<sup>15</sup> Waggoner WF, Siegal M. Pit and fissure sealant application: updating the technique. *J Am Dent Assoc* 1996; 127: 351-360.

<sup>16</sup> Mascarenhas AK, Moursi AM. Use of fissure sealant retention as an outcome measure in the dental school setting. *J Dent Educ* 2001; 65(9): 861-865.

<sup>17</sup> Carol AM, Mary EM. Minimally Invasive Dentistry. *JADA*, Vol 134, January 2003.

<sup>18</sup> Peters MC, Mc Lean ME. Minimally invasive operative care, I: minimal intervention and concepts of minimally invasive cavity preparations. *J Adhes Dent* 2001;3 (1): 7-16.

<sup>19</sup> Peters MC, Mc Lean ME. Minimally invasive operative care, II: contemporary techniques and materials-an overview. *J Adhes Dent* 2001;3 (1): 17-31.

<sup>20</sup> Tyas MJ, Anusavice KJ, Frencken JE, Mount GJ. Minimal intervention dentistry: a review. *FDI Commission Project 1-97. Int Dent J*.

<sup>21</sup> Marinho VC. Cochrane reviews of randomised trials of fluoride therapies for preventing dental caries. *Eur Arch Pediatr Dent*. 2009 Sept; 10(3):183-91.

<sup>22</sup> Petersson LG, Twetman S, Dahlgren H, Norlund A, Holm A-K, Nordenram G, Lagerlof F, Soder B, Kallestal C, Mejare I, Exelsson S, Lingstrom P. Professional fluoride varnish treatment for caries control: a systematic review of clinical trials. *Acta Odontol Scand* 2004; 62:170-176. ISSN 0001-6357.

trials. A systematic review<sup>23</sup> on the use of fluoride varnish recommended that any protocol on the use of fluoride varnish should be based on the risk assessment. The best indicator of risk for caries is previous or current caries experience.

There is clear evidence<sup>20</sup> of the efficacy of fluoride varnish in preventing dental caries in children and adolescents, with 2 applications<sup>24</sup> in a year (level of evidence I, grade of recommendation grade A).

## 2. BACKGROUND

### 2.1 School-based Fissure Sealant Programme

The fissure sealant programme was started as a pilot programme in the Federal Territory Kuala Lumpur in 1987-1988 and subsequently expanded ad-hoc in many states. In 1993, a special allocation was granted for the purchase of equipment for the programme. Portable cutting instruments purchased since then, have specified oil-free compressors. In 1998, a standardised guideline was formulated for the conduct of a national school-based programme, and the programme was subsequently launched in 1999<sup>25</sup>. However, collection of fissure sealant data has pertained only to performance indicators - the number of children involved, the number of teeth rendered fissure sealants and the number of sealant re-applied.

Based on feedback received from two workshops conducted in Malacca and Johore Bahru in 2000 and 2002 respectively, a decision was made to review the 1999 guidelines, in particular the need to continuously monitor the impact of the programme on caries.

In 2003, the second edition of the Guidelines was issued<sup>26</sup>. This edition included various aspects of FS application, including clinical technique, criteria of patient and tooth selection and conduct of a longitudinal study cohort group of aged 8-year-olds in 2003. The findings in terms of caries outcome in the longitudinal study

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<sup>23</sup> Azarpazhooch A, Patricia AM. Fluoride varnish in the Prevention of Dental Caries in Children and adolescents: A Systematic review. JCDA. [www.cda-adc.ca/jcda](http://www.cda-adc.ca/jcda). February 2008, Vol. 74, No.1.

<sup>24</sup> Lawrence H, Binguis D, Douglas J, Switzer B, McKeown, L, Figueiredo R, Laporte A. A 2-year community trial of fluoride varnish for the prevention of early childhood caries in aboriginal children. Annual Canadian Association of Public Health Dentistry Conference; 2006 Aug 24-26; St. John's, Newfoundland.

<sup>25</sup> Oral Health Division, Ministry of Health Malaysia. School-based Fissure Sealant Programme. Guidelines to implementation. First Edition. Kuala Lumpur: MOH/K/GIG/2.99 (GU), March 1999.

<sup>26</sup> Oral Health Division, Ministry of Health Malaysia. Guidelines: School-based Fissure Sealant Programme. Second Edition. Kuala Lumpur: MOH/K/GIG/1.2003(GU), March 2003.

for School-based Fissure Sealant Programme<sup>27</sup> support policy decisions taken for the integrated school fissure sealant programme. The programme can be effective 'outreach' approach to prevent caries and should be part of a comprehensive community strategy to prevent dental caries. The second edition also incorporated glass ionomer cements (GIC) as fissure sealant material<sup>26</sup>. The revised guidelines called for monitoring and evaluation of the impact of the programme. The present document is based on the Guidelines on School-based Fissure Sealant Programme, Second Edition<sup>26</sup>. In view of the implementation of MMI, the review of this FS Guidelines is timely in light of research evidence, recent literature and newer FS materials in the market that encourage and enable early FS applications without waiting for full eruption of teeth<sup>28,29</sup>.

In the national surveys, NOHSS 2007<sup>2</sup> and 2017<sup>1</sup> revealed lower first permanent molars as most caries-susceptible compared to other teeth and showed the greatest need for 1-surface restorations. Evaluation on the trend of occlusal caries<sup>32</sup> and the increasing need of preventive care<sup>1</sup> support the continuation of fissure sealant programme.

## 2.2 School-based Preventive Resin Restoration

In school dental service, PRR has been carried out as part of treatment procedure under Incremental Dental Care (IDC) for schoolchildren and has all the while been considered as a restorative procedure<sup>30</sup>. However, with the implementation of MMI, PRR is classified into 3 types; PRR Type 1, 2 and 3. Only PRR Type 1 is defined as non-invasive, used in the management of early caries lesion and can be considered as NTR. Although PRR has been carried-out in IDC for many years, the reporting of PRR in Health Information Management System (HIMS) data is unstandardized and could possibly be under reported. With the implementation of MMI, data on PRR has become more important for monitoring and evaluation purposes.

<sup>27</sup> Evaluation of the school-based fissure sealant programme: A Longitudinal Study. Oral Health Division, Ministry of Health Malaysia 2010.

<sup>28</sup> Subramaniam P, Konde S, Mandana, DK. Retention of a resin-based sealant and a glass ionomer used as a fissure: a comparative clinical study. J Indian Soc Pedod Prevent Dent 2008 p114- 120. Available from: <http://jisppd.com>

<sup>29</sup> Feigal RJ, Donly KJ. The use of pit and fissure sealants. Pediatr Dent. 2006 Mar-Apr;28(2):143-50; discussion 192-8.

<sup>30</sup> Oral Health Division, Ministry of Health Malaysia. "Oral Healthcare for School Children in Malaysia." Sept. 2006. Serial No. MOH/K/GIG/5.2007 (BK).

### 2.3 Fluoride Varnish Programme in Malaysia

The practice of fluoride varnish application among schoolchildren under IDC is varied among states. FV was not commonly used in school dental service until the implementation of MMI.

However, FV programmes for toddlers was introduced and piloted in Sabah, Kelantan and Terengganu in 2011 following the formulation of 'A Guideline of Early Childhood Oral Healthcare Programme' (2008)<sup>31</sup> that comprises national strategies and activities to prevent and manage the caries lesion in young children. Recent data shows only 28.7% of 5-year-old children are caries free<sup>29</sup>. The finding was below the national target, that targets at least 50% of 5- and 6-year-old children are caries free by the year 2020<sup>32</sup>. This data supports the need to extend the FV programme to preschool and schoolchildren under IDC, in line with the implementation of MMI.

### 2.4 Adequacy of School-based FS, PRR and FV Programme

Over the last 5 years, the percentage of children in need of FS and were rendered FS have increased, from 95.0% in year 2015 to 95.9% in 2018 (**Table 1**). The percentage of teeth in need and rendered FS have also increased, from 94.9% in 2015 to 95.4% in 2018 (**Table 1**).

**Table 1**  
**Provision of Fissure Sealant Year 2015-2018**

Year	No. of Children			No. of Teeth		
	Needed FS	Rendered FS		Needed FS	Rendered FS	
	n	n	%	n	n	%
<b>2015</b>	189383	179897	95.0	383703	364270	94.9
<b>2016</b>	199620	190713	95.5	402788	383909	95.3
<b>2017</b>	222291	204605	92.0	470692	426095	90.5
<b>2018</b>	256117	245696	95.9	532598	508041	95.4

Source: Oral Health Programme, HIMS, Health Informatic Centre, MOH

<sup>31</sup> Oral Health Division, Ministry of Health Malaysia. Early Childhood Oral Healthcare. May 2008. Serial No. MOH/K/GIG/3.2008 (BK).

<sup>32</sup> Oral Health Division, Ministry of Health Malaysia. National Oral Health Plan for Malaysia 2011-2020. February 2011. Serial No. MOH/K/GIG/ 7.2011(BK).

In this programme, the trend data of decayed teeth among selected Year 6 schoolchildren over the years 2015-2018 was also captured. Over this period, the data shows that 71.9% -74.7% caries experience were in posterior teeth of which 63.7% – 67.8% involved only occlusal surfaces (**Table 2**).

**Table 2**  
**Trend Data of Decayed Teeth among Year 6 Schoolchildren, 2015-2018**

Year	No. of Teeth with Caries Experience (* D + F) (include all teeth)	No. and Percentage of Teeth with Occlusal Caries Experience (D + F)				No. and Percentage of Caries in Anterior Teeth	
		All type (** Class I and II)		Class I only			
		N	n1	%	n2	%	N-n1
2015	341614	245580	71.9	217622	63.7	96034	28.1
2016	326614	238989	73.2	216141	66.2	87625	26.8
2017	303320	221302	73.0	197512	65.11	82018	27.0
2018	286324	213979	74.7	194234	67.8	72345	25.3

Source: Oral Health Programme, HIMS, Health Informatic Centre, MOH

\* D: Carious tooth; F: Filled tooth

\*\* Class I: Caries involves only the occlusal surface of the posterior tooth

Class II: Caries involves other surfaces and/or occlusal of the posterior tooth

As for PRR and FV, data collections were only more structured following the implementation of MMI in 2018. Thus, with the implementation of CPPC among preschool and schoolchildren, clinical monitoring/audit is strongly recommended to be carried out to ensure the validity of data collected and effectiveness of this preventive programme.

### 3. RATIONALE

At the International Consensus Workshop on Caries Clinical Trials in 2002<sup>33</sup>, it was concluded that there was a need to detect dental caries at the early non-cavitated stages and to classify the caries process for effective management. It allows the

<sup>33</sup> Pitts, Nigel & W Stamm, J. (2004). International Consensus Workshop on Caries Clinical Trials (ICW-CCT)--Final Consensus Statements: Agreeing Where the Evidence Leads. Journal of dental research. 83 Spec No C. C125-8. 10.1177/154405910408301S27.

clinician to make better informed decisions about appropriate diagnosis, prognosis, and clinical management at both the individual and public health levels. This approach provides a framework to enable personalized total caries management for improved long term oral health outcomes for the schoolchildren.

In agreement with this concept, the use of Modified MOH ICDAS (MMI) was initiated in IDC in 2014. Taking a step further with adopting the Caries Risk Assessment in school service, it is thus timely to develop this guideline on CPPC to standardize the practice and management of clinical prevention for dental caries among preschool and schoolchildren.

Evaluation on the trend of occlusal caries<sup>32</sup>, high proportion of schoolchildren found with early caries lesions and increasing need of preventive care<sup>1</sup> support the continuation of clinical prevention programme in IDC for preschool and schoolchildren. Although clinical prevention has been carried-out in IDC, the reporting of these in HIMS data is unstandardized and could possibly be under reported. To date the practices of clinical preventive treatments are varied among states. Thus, there is an urgent need to formulate this CPPC guideline to achieve a standard practice for preventive care in the IDC for preschool and schoolchildren.

## **4. OBJECTIVES**

### **4.1 General Objective**

The general objective of these guidelines is to establish a standardized, comprehensive and systematic **Clinical Prevention Programme For Caries (CPPC)** as an integral part of the Malaysian IDC programme for preschool and schoolchildren.

### **4.2 Specific Objectives**

- a) To strengthen and implement Clinical Prevention Programme for Caries as part of the IDC programme for preschool and schoolchildren.
- b) To provide appropriate management procedures for early caries lesions.
- c) To monitor and evaluate Clinical Prevention Programme for Caries.

## 5. IMPLEMENTATION

### 5.1 Scope

The programme shall cover preschool and schoolchildren under the incremental dental care programme and on permanent dentition. Children with special needs, for example, the handicapped, the medically compromised or those from an obvious disadvantaged social background shall be given priority.

### 5.2 Pre-requisite for CPPC

The necessary prerequisites for a CPPC programme rest on the availability of dental officers and dental therapists trained in the use and application of CPPC and on the procurement of oil-free portable equipment (vacuolyser, 3-way syringe and oil-free compressor) and materials (**Appendix 2**). These factors will determine the expansiveness and sustainability of the CPPC programme.

For the implementation of CPPC, the following suggestions are made:

- Use of MMI criteria for screening of early caries lesions.
- Use of CRA tool for the management of clinical prevention measures for caries
- Training of operators (refer to Operational Manual Implementation of Early Caries Detection and Management in the Oral Health Programme, 2019)
- Conduct clinical monitoring/audit (refer to *SOP Tatacara Pelaksanaan Pemantauan Klinikal*)

### 5.3 Examination Procedures

Examination procedures are as follows:

- Undertake visual caries assessment under normal operating light device. There shall be no invasive probing, use of dental radiography or fiber optic transillumination.
- Children may brush their teeth to remove plaque prior to the examination if logistically feasible. However, this is not a prerequisite for examination.
- To enhance detection of early caries lesion, operators are advised to remove excessive plaque accumulation on the surfaces of teeth with gauze prior to examination
- Examine teeth in the accepted order from upper right (UR) to upper left (UL), lower left (LL) and ending with lower right (LR) quadrant.



- Examine all teeth present. If a permanent and a deciduous tooth occupy the same tooth space, the status of both teeth should be recorded.
- For tooth code: record as '0' for a tooth with early caries lesion.
- For surface code: record as E10/E12/E13 for surface code with early caries lesion. Criteria for these codes are as attached in **Appendix 3**.
- **Only permanent teeth** are to be scored with the surface 'E' codes. Decision tree for surface codes to guide clinical operators during clinical examination is as shown in **Appendix 3a**.

#### 5.4 Caries Risk Assessment

Caries risk assessment (CRA) can assist clinical operators with decisions regarding treatment based on caries risk and patient compliance and are essential elements of contemporary clinical care for patients. The following steps of Caries Risk Assessment (CRA) are used during the oral health screening, as shown in LP.8-1 Pin 8/2019, sections H (**Appendix 4**). Steps in CRA are as follows:

##### **Step 1: Caries experience assessment**

Clinical examination to determine sound tooth, sound tooth with early caries lesions and cavitated caries tooth, (Step 1 in **Appendix 4**).

##### **Step 2: Risk factor assessment**

Assessment is based on the following criteria (Step 2 in **Appendix 4**):

- a) Visible plaque (Score C and E)
- b) Crowding
- c) Presence of dental appliances
- d) Fluoride exposure
- e) Sugar/snacks intake between meals
- f) Medically compromised patient
- g) Mother/sibling caries experience history
- h) Dry mouth

### Step 3: Caries risk indicator

Based on the above profile, patients shall be categorized as having low/moderate/high risk to caries (Step 3 in **Appendix 4**).

### 5.5 Management Recommendation based on CRA

Management of patients shall be based on CRA profile. All children regardless of risk profile shall be given brief dental health education (DHE) and tooth brushing session. Children with moderate/high risk shall receive diet counselling and other preventive strategies (**Table 3**). Children with early caries lesions can be categorized into moderate/high risk for caries since these are precavitated lesions that are indicative of caries activity. Therefore, all surfaces with early caries lesions shall receive clinical preventive treatments (FV/FS/PRR Type 1). As for children with no early caries lesion detected but are at moderate risk, preventive strategies other than FS, FV or PRR Type 1 can be taken.

**Table 3**  
**Recommendations for Low/Moderate/High Risk for Caries**

Management Recommendation	Low	Moderate	High
1. Brush 2x with fluoridated toothpaste 2. Patient education	X	X	X
3. Diet counselling 4. Chew sugar-free gum 5. High-efficacy fluoride toothpaste 6. Fluoride mouthwash 7. Fluoride varnish 8. Sealant application 9. PRR type 1		X	X
10. Restoration		X	X

Recall visits are determined by clinical operators at 3, 6 or 12 months interval (Step 4 in **Appendix 4**). Children with consecutively 3 high caries risk indicators in CRA after intervention shall be referred to Dental Public Health Specialist Unit (DPHSU) / dental clinic for further management.

## 5.6 Material selection for Fissure Sealant, Fluoride Varnish and Preventive Resin Restoration.

Various types of materials have been produced in the market. Each of these materials has its own advantages for specific uses. The selection types of material and comparisons of uses for each of these materials can be referred to **Appendix 5** for more details.

### Fissure Sealant Materials for Partially and Newly Erupted Teeth.

The risk of caries' developing is highest during the first few years after tooth eruption<sup>34</sup>. Partially erupted molars with the operculum covering the distal one half of these teeth during the eruption process allows for the retention of plaque and the initiation of the carious process before complete eruption has occurred<sup>35</sup>. The location of the permanent molars in the posterior region of the child's mouth also complicates his or her ability to properly clean these areas and remove food debris. All of these factors contribute to the increased occlusal pit-and-fissure caries rate of permanent first molars. Many studies suggested that one of the most effective ways to prevent caries in pits and fissures is to place sealants<sup>36</sup>. However, achieving good moisture control is one of the greatest challenges to successful sealant application. Resin based sealant application is particularly sensitive to moisture contamination, and may require re- treatment if used on teeth that are not completely above the gingival level<sup>37</sup>.

The use of Glass Ionomer Sealant (GIC) has been reported in many studies to be used as a fissure protection measure in newly erupted first molars due to its fluoride release, moisture tolerant and the relatively short application time<sup>38,39</sup>.

<sup>34</sup> National Center for Health Statistics. Health, United States, 2009 With Special Feature on Medical Technology. Hyattsville, Md.:2010:306-307.

<sup>35</sup> Simonsen RJ. Retention and effectiveness of dental sealant after 15 years. JADA 1991;122(10):34-42.

<sup>36</sup> Feigal RJ, Musherure P, Gillespie B, Levy-Polack M, Quelhas I, Hebling J. Improved sealant retention with bonding agents: a clinical study of two-bottle and single-bottle systems. J Dent Res. 2000;79:1850-6.

<sup>37</sup> Dennison JB, Straffon LH, More FG. Evaluating tooth eruption on sealant efficacy. J Am Dent Assoc 1990; 121(95): 610-4

<sup>38</sup> Taifour D, Frencken J.E, Van't Hot .M, Beiruti N, Train G.J. Effects of glass ionomer sealants in newly erupted first molars after first molars after 5 years : a pilot study. Community Dent Oral Epidemiology. 2003;30:304-9

<sup>39</sup> Antonson S.A, Antonson Donald E, Brener S, Crutchfield J, Larumbe J, Michaud C, Yazici R, Hardigan P.C, Alempour S, Evans D, Ocanto R. Twenty-four month clinical evaluation of fissure Sealants on partially erupted permanent first molars : Glass Ionomer versus resin-based sealant. JADA. 2012;143 (2): 115-122.

<sup>40</sup> Irish Oral Health Service Guideline Initiative. Pit and Fissure Sealants: Evidence-based guidance on the use of sealants for the prevention and management of pit and fissure caries.2010

The following are the recommended measures for inadequate moisture control<sup>40</sup> :

- a) Where resin-based sealant is indicated and moisture control is difficult to achieve but patient cooperation allows, resin-based sealant can be attempted and reviewed within 6 months.
- b) Where resin-based sealant is indicated but adequate moisture control cannot be achieved, fluoride varnish containing at least 22,600 ppm Fluoride should be applied to pits and fissures at intervals of 3-6 months until isolation can be achieved.
- c) Glass ionomer cement may be considered, as an interim preventive measure when there are indications for placement of a resin-based sealant but concerns about moisture control may compromise such placement.

### 5.7 Standard Operating Procedure (SOP) for CPPC Procedures

The identification and determination of tooth for CPPC should be done prior to the application of fissure sealant, PRR or fluoride varnish. The steps and flow of respective CPPC procedure is shown as below;

- **Appendix 6** : SOP of FS Application using Resin-Based Fissure Sealant
- **Appendix 6a** : Flow Chart of SOP for FS Application using Resin-Based Fissure Sealant
- **Appendix 7** : SOP of FS Application using GIC
- **Appendix 7a** : Flow Chart of SOP for FS Application using GIC
- **Appendix 8** : SOP of Preventive Resin Restoration (PRR Type 1), using Resin-Based Sealant
- **Appendix 8a** : Flow Chart of SOP for Preventive Resin Restoration (PRR Type 1) using Resin-Based Sealant
- **Appendix 9** : SOP of Preventive Resin Restoration (PRR Type 1) using GIC
- **Appendix 9a** : Flow Chart of SOP for Preventive Resin Restoration (PRR Type 1) using GIC

- **Appendix 10** : SOP of Fluoride Varnish Application
- **Appendix 10a**: Flow Chart of SOP for Fluoride Varnish Application

### 5.8 Criteria for FS/PRR/FV Re-application

A tooth shall be considered for a FS/PRR re-application when there is total or partial loss of sealant with an obvious catch when probed. However, it is recommended to re-assess the tooth prior to re-application (**Table 4**). In the condition of clinically sound tooth, with no catch when probed and categorized as low CRA, re-application is not needed.

**Table 4**  
**FS/PRR Status Assessment Criteria**

Status FS/PRR	Description of Status FS/PRR	Requirement for FS/PRR re-application (Yes /No)
Intact FS/PRR	Sealant present on all of fissure pattern	No
Partially-lost FS/PRR	Sealant present but some are missing from fissure and pit pattern	Yes (if patient is moderate/high CRA)
Total-lost FS/PRR	No sealant detected in fissure-pattern	Yes (if patient is moderate/high CRA)
Failed FS/PRR	A tooth that developed caries (diagnose as code 7) on the same surface after placement of sealant. Checked for softened area, discoloration and undermined enamel	No to do minimal intervention (PRR type 2,3 or restoration)

For FV, re-application is recommended to be carried-out six monthly for two years. However, this will depend on availability of resources and practicality.

### 5.9 Responsibility

The State Deputy Director of Health (Oral Health) shall be responsible for the implementations of the CPPC in the state. The Deputy Director shall appoint a Principal Assistant Director or a District Dental Officer (DDO) to co-ordinate the programme at state level. The District Dental Officer (DDO) shall be responsible for the implementation of the CPPC in the district while the dental officer in-charge of clinics shall be responsible for the programme at the clinic level.

## 5.10 Training

All clinical operators would require adequate training and standardization in the detection of early caries lesions. In addition, all assistants need to be briefed on the recording of codes. The document 'Operational Manual Implementation of Early Caries Detection and Management in the Oral Health Programme, 2019' shall be referred for training of clinical operators. Continuous training is essential to enhance knowledge and skills of dental officers and dental therapists in the selection of patient and tooth for CPPC. The training shall include:

- a) Caries Risk Assessment
- b) Standardisation and calibration of caries diagnosis and treatment
- c) Hands-on training on use and application of FS, FV and PRR Type 1
- d) Conduct clinical monitoring/audit (refer to *SOP Tatacara Pelaksanaan Pemantauan Klinikal*)
- e) Data collection and reporting
- f) Monitoring and evaluation

## 6. MONITORING AND EVALUATION

### 6.1 Responsibilities

A state coordinator appointed by the respective State Deputy Director of Health (Oral Health) shall monitor and evaluate the outcome of the programme at state and district levels. Clinical audit should be conducted randomly and at regular intervals.

### 6.2 Data reporting

Each district/state are responsible for the monitoring and evaluation of its CPPC programme. The compiled district and state data shall be channelled to national level as stated in 6.3.

### 6.3 Monitoring

Data shall be collected manually using formats as indicated below

- The manual/computerized return of CPPC 1/20 and CPPC 2/20 (**Appendix 11 and 11a**) to be sent to national level by **10<sup>th</sup> January of the following year**.
- The existing return formats of Modified PG 307A / PG 201
- The existing return formats of ICDAS PG 201 A, MMI 1 (clinic level), MMI 2 (State level, to be sent by **10<sup>th</sup> January and July of the year**) and MMI 3 (National level, compiled returns) refer to **Appendix 12**.
- FS 1/2003 Pin. 1/20 (**Appendix 13**) for the cohort group if longitudinal study is carried-out. This form is to be attached to LP8. The link between the school-based programme and the longitudinal study is illustrated as in **Appendix 14**.

### 6.4 Evaluation

Evaluation of the CPPC shall be carried out regularly at district and state levels. Performance Indicators used for evaluation include process indicators (**Table 5**) and outcome measures (**Table 6**).

**Table 5**  
**Output Indicators**

CPPC Treatment	Indicators	Numerator	Denominator	Standard
FS	% of teeth rendered FS	No. of teeth FS Rendered	No. of teeth FS Needed	95%
	% of patients rendered FS	No. of patients rendered FS	No. of patients needed FS	96%
FV	% of teeth rendered FV	No. of teeth rendered FV	No. of teeth Needed FV	80%
PRR Type 1	% of Teeth rendered PRR	No. of teeth rendered PRR	No. of teeth Needed PRR	100%
	% of patients rendered PRR Type 1	No. of patients rendered PRR Type 1	No. of patients needed PRR Type 1	100%

**Table 6**  
**Impact Indicators**

Type of Clinical Prevention	Indicators	Numerator	Denominator	Standard
FS, FV, PRR Type 1	i) % of 6-yrs old Caries Free	i) 6-yrs old (*DMFT=0, *dft=0)	No. of new attendance of i) 6-yrs old	50%
	ii) % of 12-yrs old Caries Free	ii) 12-yrs old (*DMFT = 0)	ii) 12-yrs old	70%
	iii) % of 16-yrs old Caries Free	iii) 16-yrs old (*DMFT = 0)	iii) 16-yrs old	50%
	i) DMFT 6-yrs old ii) DMFT 12-yrs old iii) DMFT 16-yrs old	No. of *DMFT i) 6-yrs old ii) 12-yrs old iii) 16-yrs old	No. of new attendance of i) 6-yrs old ii) 12-yrs old iii) 16-yrs old	$\leq 1$ $\leq 1$ $\leq 2$
FS	% of teeth occlusal caries experience (D + F)	No. of teeth occlusal caries experience (Class 1)	No. of teeth caries experience	Trend monitoring

*\*X is included in D/d*

## 7. RESEARCH

Research activities can be carried out during implementation of this programme at state and district levels. An example of a research topic is as follows:

- a) Evaluation of the outcomes of fissure sealant in CPPC: A longitudinal study, to be coordinated by Dental Public Health Specialists (DPHS) in states interested in conducting the study (suggested forms as in **Appendix 13**).

## 8. CONCLUSION

This Guideline is developed to facilitate a standardized and systematic implementation of CPPC to strengthen caries control and emphasize on the management of early caries lesion. The implementation of CPPC programme is an effort to reduce dental caries and further improve the proportion of caries free Malaysian children.



## Appendix 1

## Effectiveness of Fissure Sealant Application

No.	Types of Materials	Retention Rate	Caries Outcome	Age range of children included in the studies reviewed	Reference
<b>Systematic reviews</b>					
1	Compare resin sealant with no sealant	NA	Exposure to school-based or school-linked sealant delivery programmes was associated with a median relative decrease in dental caries experience of 60% (range 5% - 93%).	6-17 years	Truman et al., 2002
2	Compare resin sealant with no sealant	NA	60% reduction in caries from 2 - 5 years after placement	6-19 years	Griffin 2008
3	Compare resin sealant with no sealant	79-92% at 12-month follow up; 71-85% at 24-month ; 61-80% at 36-month; 52% at 48 months	the reduction in caries ranged from 87% at 12 months to 60% at 48-54 months	5 to 16 years	Ahovuo-Saloranta et al. 2008 (Cochrane Review)
4	Compare resin sealant with no sealant		Resin sealants compared with no sealants prevented caries in the first permanent molars of children five to 10 years old (odds ratio (OR) 0.12, 95% confidence interval (CI) 0.07 to 0.19). At 48 to 54 months follow-up, the caries preventive effect was maintained (OR 0.21, 95% CI 0.16 to 0.28).	5 to 16 years	Ahovuo-Saloranta et al. 2013 (Cochrane Review)
5	Compare resin with GIC sealant	NA	No evidence that either material was superior to the other in the prevention of caries	6-16 years	Yengopal et al., 2009

6	Compare resin with GIC sealant	<p>Four of the eight studies comparing resin-based sealant with glass ionomer</p> <p>reported better retention for resin-based sealants. Resin-based: retention-45%-95%</p> <p>1%-10.3%. (2-7 years follow)</p> <p>Three studies – low for both materials (5-40%) (24-44 months follow up)</p> <p>One study – high for both materials 83% GIC, 58% resin) (24 months follow up)</p>	<p>Conflicting results for studies included: In three studies, the resin-based sealants were found to be superior to GIC in caries prevention. In two studies GIC was better, and in three other studies there was no difference between the two.</p>	5 to 16 years	<p>Ahovuo-Saloranta et al. 2008</p> <p>(Cochrane Review)</p>
7	Compare resin with GIC sealant	NA	<p>No evidence that either resin based or glass ionomer sealant materials is superior to the other in preventing dentine lesion development in pits and fissures over time</p>		Beiruti et al., 2006
8	Compare resin with GIC sealant	NA	<p>no difference between the caries- preventive effects of GIC and resin-based FS</p>		Yengopal and Mickenautsch, 2010

Local studies					
No.	Types of Materials	Retention Rate	Caries Outcome	Aged of children	Reference
1	Compare resin-based sealant GIC sealant	<p>About 27.4% of resin based sealant remains intact at 30 months' review while only 7.1% GIC remains intact for the same period of time.</p> <p>There is no significant difference in retention rates between Delton sealant and Fuji IX cement at 12 months' review (p-value=0.05). Findings showed that retention rates</p> <p>differed significantly by operator for resin-based sealants but not for glass ionomer cement</p>	<p>About 1.9% of teeth sealed with resin based sealant developed caries at 12 months review while 3.1% of GIC sealed teeth developed caries at 12 months review. Invasive fissure sealant which dropped out in caries prone children contributed to the high caries incidence.</p>		Muz'ini et al. 2005 (Prospective study)
2	Compare resin-based sealant GIC sealant	<p>Re Resin-based sealants had significantly higher retention rates compared to GIC sealants (p&lt;0.001). Retention rate of resin-based sealants decreased from 69.5% (Year 1 Review) to 37.7% (Year 4 Review); and retention rates of GIC sealants fell from 47.5% (Year 1 Review) to 16.2% (Year 4 Review).</p>	<p>Proportions of First Permanent Molars FPM with resin-based FS affected by caries were 4.0% in 2004 and increased to 13.5% by 2007, while the proportions of FPM with FS using GIC were 3.5% in 2004 increasing to 14.4% in 2007. GIC-sealed teeth had higher 'failed FS' but these were not significantly different from those of resin-sealed teeth for 3 of the 4 years of review (p&gt;0.05).</p>	8 years at baseline	Tan et al., 2010 (Cohort Study)

## Appendix 2

### **BASIC REQUIREMENTS FOR A SCHOOL BASED CPPC**

#### **Equipment**

- Portable cutting unit with oil-free compressor
- Oil-free 3-way syringe
- Vacuolyser and suction tips
- Light cure equipment (if using light cure resin)
- Portable chair
- Portable light
- Basic dental instruments

#### **Materials**

- Self-cure or light cure composite resin kit (opaque/tinted) or GIC
- Fluoride Varnish material
- Cotton rolls
- White stones for occlusal adjustment of sealant
- Articulating paper
- Petroleum Jelly / Vaseline (if using GIC)
- Dentine conditioner (if GIC)

## Appendix 3

### CODES FOR EARLY CARIES LESION, TREATMENT NEED AND RENDERED

1. Score **E** if fulfilled with **AT LEAST ONE** of the criteria<sup>41</sup> below:

a. There is a clear carious opacity (white spot lesion) and / or brown carious discoloration at enamel surface.

**At buccal and lingual:** usually the lesion is located in close proximity (in touch or within 1 mm) of the gingival margin.

b. Localized enamel breakdown due to caries with no visible dentine.

**At pit or fissure:** there is a cavity, BUT the dentine is NOT visible in the walls or base of the cavity. If in doubt, a blunt probe can be used gently to confirm the presence of a cavity. This is achieved by sliding the probe along the suspect pit or fissure and a limited discontinuity is detected if the tip probe drops into the surface of the enamel cavity.

**At smooth surface:** there is distinct loss of enamel integrity, viewed from the buccal or lingual direction. If in doubt, a blunt probe can be used gently across the surface to confirm the loss of surface integrity.

c. Presence of deep and/or complex pattern(s) of pits and fissures.

#### **Note:**

- When in doubt, record as SOUND (code 0)
- Record as sound (code 0) for tooth, code for surface coded with code E.

#### **2. Follow these steps for treatment need codes:**

- Step 1: the surface **must fulfil at least one** of the criteria for code E
- Step 2: Suggested treatment\* based on surface are:
  - a. Pit and fissure: E10 if no cavitation /E12 if there is cavitation
  - b. Smooth surfaces: E13

<sup>41</sup> International Caries Detection and Assessment System (ICDAS) Coordinating Committee. Criteria Manual. International Caries Detection and Assessment System (ICDAS II). Workshop held in Baltimore, Maryland, March 12th-14th 2005

**Guide to determine surface codes:**

- E10 (need FS)
- E12 (need PRR type 1)
- E13 (need FV)

**Note:**

However, in moderate/high risk case with no early lesions detected, preventive measures other than CPPC or restoration can be adopted as in **Table 3**.

\* Treatment need is a guide only, actual treatment rendered may differ and depend on clinical judgement.

**3. Criteria for ‘Ada Restorasi Resin Pencegahan’ / PRR Type 1 (Code 11)**

PRR type 1 restoration is in place and there is no caries anywhere on the surface.

If in doubt of present of PRR type 1 in a surface, follow this step:

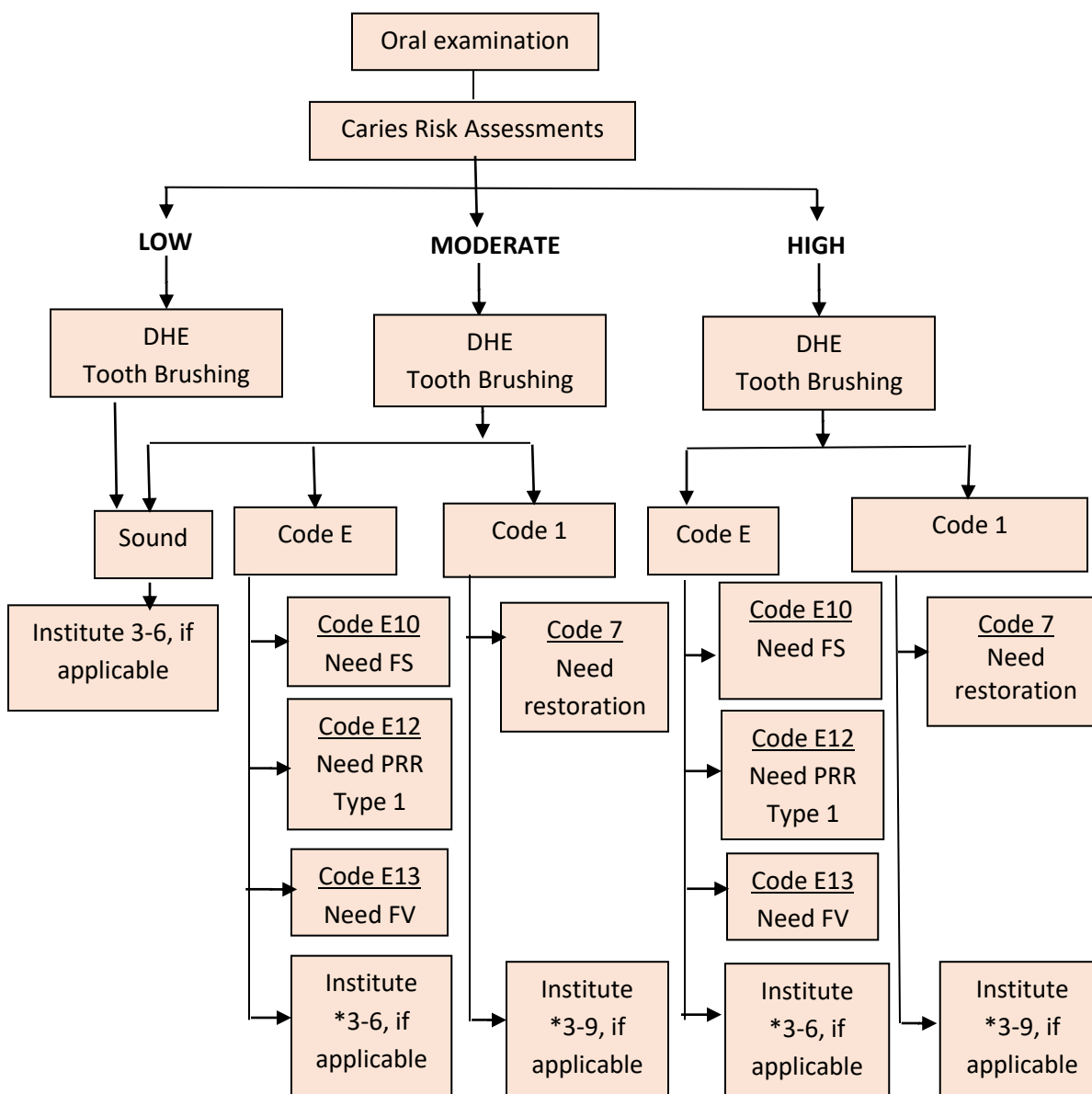
- Step 1 - Check records
- Step 2 - If not stated in the records, and in doubt whether it is PRR type 1 or Fissure Sealant, score it as 9 (*Ada Sealan Fisur*)

PRR type 2 and 3 should be recorded as filled (code 8)

Refer to the document Operational Manual Implementation of Early Caries Detection and Management in the Oral Health Programme, 2019, further details.

Appendix 3a

Flow Chart of Patient Management for CPPC



Notes:

Clinical preventive measures (eg. FS, FV and PRR Type 1) are considered as preventive procedures and defined as non-invasive and thus, can be considered as No Treatment Required (NTR) cases.

\*Refer to Table 3 for management of CRA

Appendix 4

**CARIES RISK ASSESMENT TOOL: LP. 8-1 Pin. 8/2019**

No. Rujukan Fall																																	
Tarikh																																	
<b>F. PEMERIKSAAN DAN CATATAN</b> (Tandakan ✓ Jika berkaitan)																																	
Catatan Perubahan dan Pergigian Terkini: _____																																	
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Pengambilan Alkohol																																	
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d <input type="checkbox"/>	D <input type="checkbox"/>	MBK <input type="checkbox"/>																															
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Pemeriksaan	Sound (Kod 0)	Karies Awal (Kod E)	Karies (Kod 1)																														
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<input type="checkbox"/>	Plak yang Boleh Dilihat (Skor C dan E)																																
<input type="checkbox"/>	Kesejukan Gigi																																
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<input type="checkbox"/>	Tidak Terdedah Kepada Fluorida																																
<input type="checkbox"/>	Ambil Makanan Bergula Antara Waktu Makan																																
<input type="checkbox"/>	Kompromi Perubahan / Kesihatan																																
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Langkah 4: Lawatan Susulan (Tandakan ✓)																																	
<input type="checkbox"/>	3 Bulan	<input type="checkbox"/>	6 Bulan																														
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## Appendix 5

## CPPC MATERIALS USED

### 1. Types of Pit/Fissure Sealant Materials and Comparisons of Different Types of Sealant Materials Used

There are four main types of pit/fissure sealant materials<sup>42</sup> (Table 7).

**Table 7**  
**Main Types of Pit / Fissure Sealant Materials**

TYPE OF MATERIALS	DESCRIPTION
Resin-based Sealants	Derived from urethane dimethacrylate, "UDMA," or bisphenol A-glycidyl methacrylate (also known as "bis- GMA") monomers polymerized by a chemical activator and initiator or light of a specific wavelength and intensity. Resin-based sealants may come in several types: unfilled, colorless, or tinted transparent materials or as filled, opaque, tooth- colored, or white materials.
Glass Ionomer (GI) Sealants	Cements with fluoride-release properties, originating from the acid-base reaction between a fluoroaluminosilicate glass powder and an aqueous-based polyacrylic acid solution.
Polyacid-modified resin sealants	Also known as compomers, combine resin-based material found in traditional resin-based sealants with the fluoride-releasing and adhesive properties of GI sealants.
Resin-modified GI sealants	GI sealants with resin components. This type of sealant has similar fluoride-release properties as GI, but it has a longer working time and less water sensitivity than do traditional GI sealants.

Resin-based sealants applied on occlusal surfaces of permanent molars are effective for preventing caries in children and adolescents<sup>43</sup>. Systematic review and meta-analysis done by Ahuvuo-Saloranta *et al.* have shown that resin-based sealants reduced caries by between 11% and 51% compared to no sealant, when measured at 24 to 48 months<sup>2</sup>. Wright and colleagues<sup>44</sup> conducted a systematic review with meta-analysis and compared the use of pit/fissure sealant materials on teeth with sound occlusal surfaces or non cavitated carious lesions among children and adults.

<sup>42</sup> Anusavice KJ, Shen C, Rawls HR. Phillips' science of dental materials. Elsevier Health Sciences; 2013.

<sup>43</sup> Ahuvuo-Saloranta A, Forss H, Walsh T, Nordblad A, Mäkelä M, Worthington HV. Pit and fissure sealants for preventing dental decay in permanent teeth. The Cochrane Library. 2017 Jan 1.

<sup>44</sup> Wright JT, Crall JJ, Fontana M, Gillette EJ, Nový BB, Dhar V, Donly K, Hewlett ER, Quinonez RB, Chaffin J, Crespín M. Evidence-based clinical practice guideline for the use of pit-and-fissure sealants: a report of the American Dental Association and the American Academy of Pediatric Dentistry. The Journal of the American Dental Association. 2016 Aug 1;147(8):672-82.

They recommended that :

- a) Clinicians should consider "the likelihood of experiencing lack of retention when choosing the type of sealant material most appropriate for a specific patient and clinical scenario". For example, when moisture control (dry isolation) is difficult e.g. partially erupted tooth, soft tissue impinging the occlusal surface - then GI sealant (that is more hydrophilic) should be chosen rather than resin-based sealant (hydrophobic in nature). If the moisture can be well controlled (well isolated with dry site) and long term retention is desired, then a resin-based sealant should be used.
- b) Clinicians may need to monitor sealants showing a higher risk of experiencing retention loss more often.
- c) Clinicians should carefully follow the manufacturers' instructions for each type of sealant materials to gain optimal level of retention.

Based on the recent evidence-based expert panel review by the American Dental Association (ADA) for clinicians: to arrest or reverse non-cavitated lesions on occlusal surface of both primary and permanent teeth, it is recommended that clinicians prioritize the use of 1) fissure sealants, plus 5% Sodium Fluoride (NaF) varnish with application every 3 to 6 months, or followed by 2) sealants alone; or followed by 3) 5% NaF varnish alone with application every 3 to 6 months<sup>45</sup>. The recommendations are prioritized based on the materials effectiveness, feasibility, patient values and preferences and resource use. **Table 8** shows the comparisons of different types of sealant materials.

**Table 8**  
**Comparisons of Use of Pit/Fissure Sealant Materials**

COMPARISONS	RESULTS	ABSOLUTE TERMS
GI Sealants Vs Resin-based sealants <sup>2</sup>	<p><u>Incidence of Caries:</u></p> <p>May reduce the incidence of occlusal carious lesions in permanent molars by 37% after 2 to 3 years of follow-up (OR, 0.71; 95% CI, 0.32-1.57). No significant difference was found (P=.39).*</p> <p>GI sealants may increase the incidence of carious lesions by 53% (OR, 1.53; 95% CI, 0.58-4.07); however, this difference was not statistically significant (P=.39).</p>	<p>For a population with a caries baseline risk (prevalence) of 30%, this means that use of a GI sealant would prevent 67 carious lesions out of 1,000 sealant applications (95% CI, 102 more -179 fewer lesions) compared with using a resin-based sealant after 2 to 3 years of follow-up; however, this difference was not statistically significant</p>

<sup>45</sup> Slayton, R. L., Urquhart, O., Araujo, M. W., Fontana, M., Guzmán-Armstrong, S., Nascimento, M. M., ... & Young, D. A. (2018). Evidence-based clinical practice guideline on nonrestorative treatments for carious lesions: a report from the American Dental Association. *The Journal of the American Dental Association*, 149(10), 837-849.

COMPARISONS	RESULTS	ABSOLUTE TERMS
	<p><u>Retention Rate:</u></p> <p>GI sealants may have 5 times greater risk of experiencing loss of retention from the tooth compared with resin-based sealants after 2 to 3 years of follow-up (OR, 5.06; 95% CI, 1.81-14.13).</p>	
GI Sealants vs Resin-modified GI Sealants <sup>2</sup>	<p><u>Incidence of Caries:</u></p> <p>May increase the incidence of occlusal carious lesions in permanent molars by 41% after 2 to 3 years of follow-up (OR, 1.41; 95% CI, 0.65-3.07); however, this difference was not statistically significant (<math>P=.38</math>)#</p> <p><u>Retention Rate:</u></p> <p>GI sealants would have 3 times greater risk of experiencing retention loss from the tooth compared with resin-modified GI sealants after 2 to 3 years of follow-up (OR, 3.21; 95% CI, 1.87- 5.51).</p>	<p>For a population with a caries baseline risk (prevalence) of 30%, we are expecting to have 77 more carious lesions over 1,000 sealant applications (95% CI, 82 fewer-268 more lesions) when using GI sealants compared with using a resin-modified GI sealant after 2 to 3 years of follow-up; however, this difference was not statistically significant.</p>
Resin-modified GI Sealants vs Poliacid-modified Resin Sealants <sup>2</sup>	<p><u>Incidence of Caries:</u></p> <p>May reduce the incidence of occlusal carious lesions in permanent molars by 56% after 2 to 3 years of follow-up (OR, 0.44; 95% CI, 0.11-1.82); however, this difference was not statistically significant (<math>P=.26</math>)**</p> <p><u>Retention Rate:</u></p> <p>Resin-modified GI sealants may increase the risk of loss of retention by 17% compared with polyacid-modified resin sealants after 2 to 3 years of follow-up (OR, 1.17; 95%</p>	<p>For a population with a caries baseline risk (prevalence) of 30% this means that use of resin-modified GI sealants would prevent 141 carious lesions out of 1,000 sealant applications (95% CI, 138 more-255 fewer lesions) compared with the use of polyacid-modified resin sealants after 2 to 3 years of follow-up; but this difference was not statistically significant.</p>

COMPARISONS	RESULTS	ABSOLUTE TERMS
	CI, 0.52-2.66); however, this difference was not statistically significant ( $P=.70$ ).	
Polyacid-modified Resin Sealants Vs Resin-based Sealants <sup>2</sup>	<p><u>Caries Incidence:</u></p> <p>May increase the incidence of occlusal carious lesions in permanent molars by 1% after 2 to 3 years of follow-up (OR, 1.01; 95% CI, 0.48-2.14); however, this difference was not statistically significant (<math>P=.97</math>).</p> <p><u>Retention Rate:</u></p> <p>Polyacid-modified resin sealants seem to reduce the risk of loss of retention by 13% compared with resin-based sealants after 2 to 3 years of follow-up (OR, 0.87; 95% CI, 0.12-6.21); however, this difference was not statistically significant (<math>P=.89</math>).</p>	For a population with a caries baseline risk (prevalence) of 30%, the use of polyacid-modified resin sealant would increase carious lesions by 2 out of 1,000 sealant applications (95% CI, 129 fewer-178 more lesions) compared with using a resin-based sealant after 2 to 3 years of follow-up; however, this difference was not statistically significant.

## 2. Types of Fluoride Varnishes

Fluoride varnishes comprise of active and inactive components (**Table 9**). Usually it comprises of lacquers containing 5% NaF in a resin base<sup>46</sup>. Numerous studies which demonstrated effective results in caries prevention have applied fluoride varnish with NaF of 22,600 ppm<sup>47</sup>. There are various types of fluoride varnishes available in the market with different fluoride concentrations (**Table 10**).

Studies have shown that: 1) Duraphat was effective in preventing caries among children; 2) Fluor Protector demonstrated a high fluoride uptake in enamel; 3) Duraflor prevents caries development and arrest caries progression; 4) CavityShield's fluoride content was found to be more uniform than Duraphat, can be mixed easily and applied to teeth; 5) Bifluorid 12's CaF<sub>2</sub>/NaF varnish deposited more fluoride on the surface of demineralized enamel than NaF alone and 6) Carex demonstrated a comparable efficacy among children<sup>6</sup>.

**Table 9**  
**Ingredient of Fluoride Varnish.**

Ingredient	Materials
Active Ingredient	5% sodium fluoride (NaF)
Inactive Ingredient	for flavouring and allowing fluoride sticks to tooth surface.
	Sodium saccharin (sweetener), beeswax & ethanol (to form gel and stabilize the sodium ions), shellac & mastic (to form a flexible, permeable hard surface so that the varnish will not dissolve rapidly in saliva)
	Kolophonium (as flow enhancer)

<sup>46</sup> Gnaedinger, E. (2017). Fluoride Varnish Application in the Pediatric Population.

<sup>47</sup> British Association for the Study of Community Dentistry. (2009). *Delivering Better Oral Health: An evidence-based toolkit for prevention*. Department of Health.

**Table 10**  
**Fluoride Varnish Materials in the Market<sup>48, 5</sup>**

Type of Fluoride Varnish	Manufacturer	Content	Packaging
Duraphat	Colgate Palmolive	5% NaF, F=22,600ppm	50mg/ml Dental Suspension
Fluor Protector	Ivoclar/Vivadent	Difluorosaline agent 0.7% fluoride in polyurethane varnish with acidic properties. F=8,000ppm	10ml ampules; 0.4ml single use doses
Duraflor	Pharma Science	5% NaF with xylitol and bubblegum flavour	10ml tubes
CavityShield	OMNII Oral Pharmaceuticals	5% NaF in a neutral resin	0.25ml & 0.4ml single use doses
Bifluoride 12	Voco	2.7% NaF and calcium fluoride (2.9% F) F=56,300 ppm	Unknown
Carex	Voss	1.8% Fluoride	Unknown
3M Varnish	3M	5% NaF White Varnish F=22,600 ppm with Tricalcium Phosphate	0.5ml (0.5g)of Varnish White Varnish Each 0.5ml dose contains 25mg NaF (equivalent to 11.3mg of fluoride ion)

<sup>48</sup> Chu CH, Lo EC. A review of sodium fluoride varnish. General dentistry. 2006;54(4):247-53.

### 3. Type of Materials Used for Preventive Resin Restoration

Flowable composite is the most suitable type of material for use in Preventive Resin Restorations (PRRs). The viscosity of the material allows it to be used for the minimally invasive preparations and serves as a sealant as well for the untouched part of the occlusal surface<sup>49</sup>. These flowable composites commonly found in small syringes with small-bore needles (usually 20 gauge) could be injected into a cavity preparation with varieties of viscosity, aesthetic shades<sup>7</sup> and radiopacities<sup>50</sup> between the brands.

Alternatively, the PRR unit dose tube rather than syringe with needle should be used especially for an operator with less than average hand strength or with skeletal muscular weakness (e.g. with arthritis or another orthopedic disorder). Some PRRs materials offer a selection of aesthetic shades with different radiopacities. Operators must carefully read the manufacturers' instruction manual for PRRs material used, to ensure the appropriate steps are followed such as by ensuring appropriate thickness layers (e.g. 2mm) for light curing, type of curing light device required (eg. conventional quartz halogen light) and the duration of light curing device used (e.g. 20 seconds)<sup>7</sup>.

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<sup>49</sup> Dentistry Today (2019). A durable flowable composite resin for preventive resin restorations. 1 October 2002. accessed 8 March 2019. <https://www.dentistrytoday.com/restorative-134/1846--sp-2108651331>

<sup>50</sup> Strassler HE, Massey WL. Cure depths using different curing lights. *J Dent Res.* 2002;81:A-323. Abstract 2567

## Appendix 6

**STANDARD OPERATING PROCEDURE OF FISSURE SEALANT APPLICATION  
USING RESIN-BASED SEALANT<sup>51</sup>**

RESPONSIBILITY	ACTION
DO/DT	1. Determine the tooth/teeth to be sealed and code as E10
DO/DT	2. Determine material to be used. Resin-based are the first choice of material for fissure-sealant unless in the condition where the moisture-control is unachievable.
DSA/HA	3. Prepare the instruments and materials.
DO/DT	4. Cleaning the tooth/teeth with a dry bristle brush or with a dry toothbrush.
DO/DT	5. Isolate and dry the tooth/teeth with rubber dam or cotton roll by use two-finger technique with effective aspiration.
DO/DT	6. Etch the enamel and follow the manufacturer's instruction. Rinse, isolate and dry the tooth/teeth after etch.
DO/DT	7. Apply the minimum amount of sealant required to adequate cover the pit and fissure. Remove air bubbles and voids before curing.
DO/DT	8. Curing the sealant by follow the manufacturer's instruction.
DO/DT	9. Check the retention and surfaces with a probe after application to ensure all fissures are completely sealed and no dislodge.
DO/DT	10. If the sealant dislodged, the sealant should be reapplied after re-cleaning (if necessary) and re-etching the exposed fissure.
DO/DT	11. Remove the cotton roll
DO/DT	12. Check occlusion using articulation paper and trim premature contact.
DO/DT	13. Give instructions to patients as follow; <ul style="list-style-type: none"> <li>i) Do not take foods within 1 hour after procedure</li> <li>ii) If any problems arise after treatment;               <ul style="list-style-type: none"> <li>• Go to the government dental clinic (during office hour) or;</li> <li>• Any other nearest dental clinic (after office hour)</li> </ul> </li> </ul>
	14. Examination, diagnosis and treatment done must be recorded comprehensively in the LP. 8-1 Pin 8/2019 or in the electronic medical records.

**Abbreviation:**

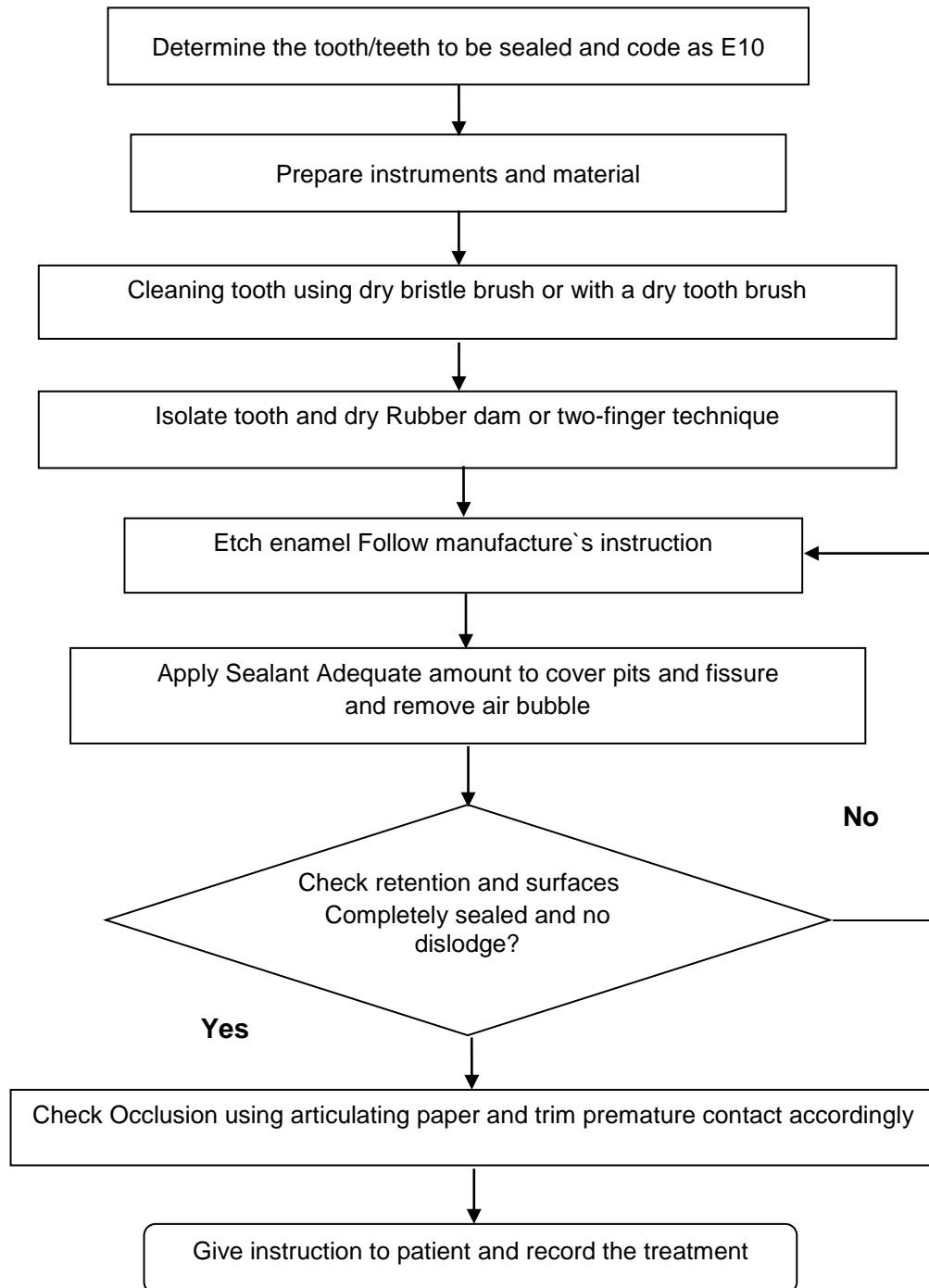
DO - Dental Officer  
 DT - Dental Therapist  
 DSA - Dental Surgery Assistant  
 HA - Health Assistant

<sup>51</sup> Oral Health Division, Ministry of Health Malaysia. Guidelines A School-Based Fissure Sealant Programme, 2<sup>nd</sup> Edition, 2003.



Appendix 6a

**FLOW CHART OF SOP FOR FS APPLICATION USING  
RESIN BASED FISSURE SEALANT**



## Appendix 7

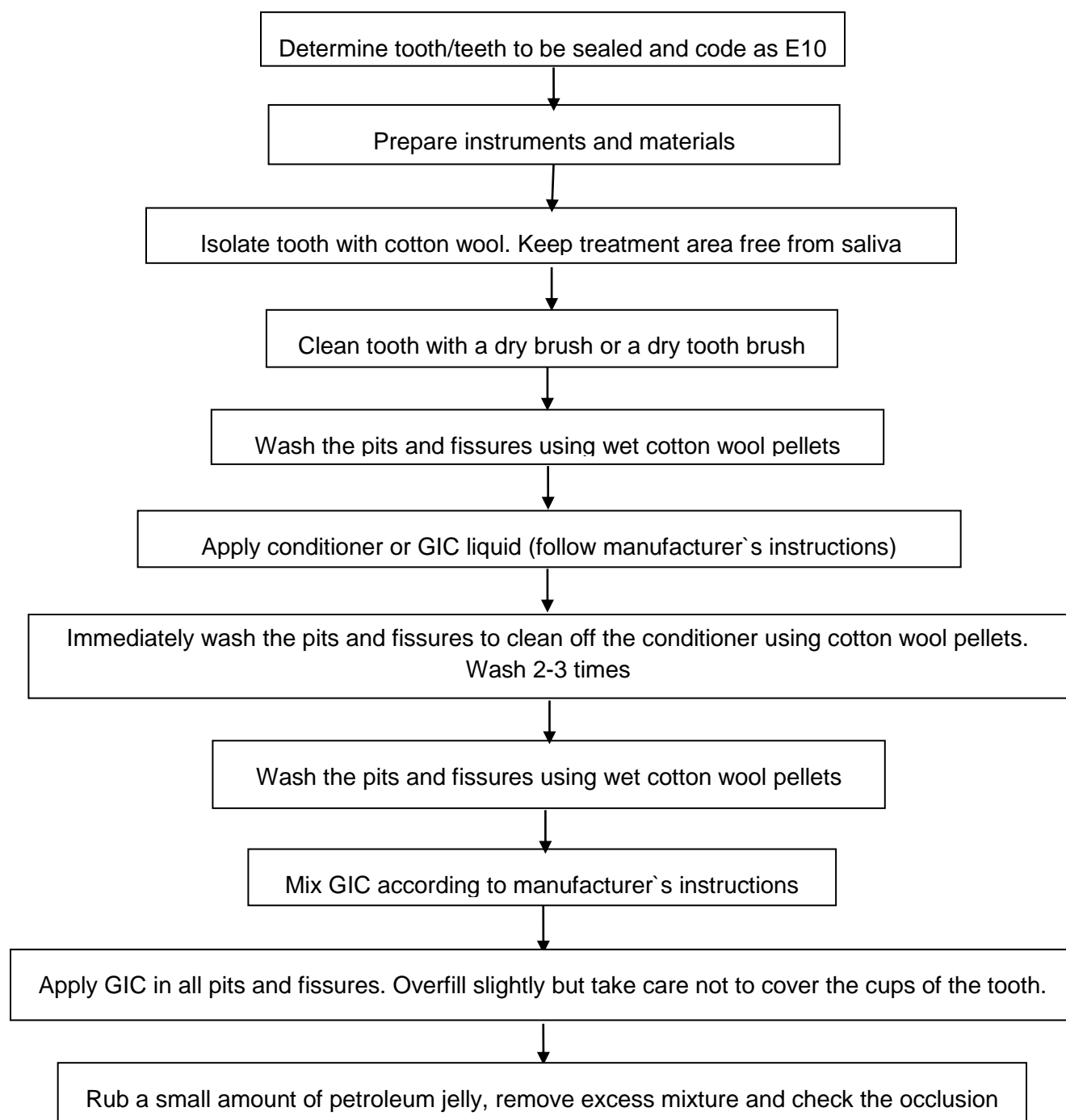
**STANDARD OPERATING PROCEDURE OF FISSURE SEALANT APPLICATION  
USING GLASS IONOMER CEMENT <sup>11</sup>**

RESPONSIBILITY	ACTION
DO/DT	1. Determine tooth/teeth to be sealed and code as E10
DO/DT	2. Determine materials to be used: GIC is the alternative material to resin based in conditions of moisture-control is unachievable
DSA/HA	3. Prepare the instruments and materials
DO/DT	4. Isolate tooth with cotton rolls. Keep treatment area free from saliva
DO/DT	5. Clean the pits and fissure of the tooth from plaque and food debris by using dry brush or a dry tooth brush
DO/DT	6. Wash the pits and fissures using wet cotton wool pellets
DO/DT	7. Apply conditioner or GIC liquid into the pits and fissures according to manufacturer`s instructions
DO/DT	8. Immediately wash the pits and fissures using wet cotton wool pellets to clean off the conditioner (wash for 2 or 3 times). Dry again the pits and fissures with cotton wool pellets
DSA/HA	9. Mix the GIC according to manufacturer`s instructions
DO/DT	10. Apply GIC in all pits and fissures. Overfill slightly but take care not to cover the cups of the tooth.
DO/DT	11. Rub a small amount of petroleum jelly on the gloved index finger. Press the GIC mixture into the pits and fissures using index fingers (press-finger technique). Remove finger sideways after a few seconds
DO/DT	12. Remove visible excess of mixture.
DO/DT	13. Check the occlusion and adjust comfortably
DO/DT	14. Apply a new layer of petroleum jelly or varnish on the on the surface of pit and fissures
DO/DT	15. Remove the cotton wool
DO/DT	16. Give instructions to patients as follow; <ul style="list-style-type: none"> <li>i) Do not take foods within 1 hour after procedure</li> <li>ii) If any problems arise after treatment; <ul style="list-style-type: none"> <li>• Go to the government dental clinic (during office hour) or;</li> <li>• Any other nearest dental clinic (after office hour)</li> </ul> </li> </ul>
DO/DT	17. Examination, diagnosis and treatment done must be recorded comprehensively in the LP. 8-1 Pin 8/2019 or in the electronic medical records

**Abbreviation:**

DO - Dental Officer  
DT - Dental Therapist  
DSA - Dental Surgery Assistant  
HA - Health Assistant

## Appendix 7a

**FLOW CHART OF SOP FOR FS APPLICATION USING  
GIC SEALANT**

## Appendix 8

**STANDARD OPERATING PROCEDURE OF PPR TYPE 1  
USING RESIN BASED SEALANT**

RESPONSIBILITY	ACTION
DO/DT/DSA/HA	1. Determine tooth/teeth to be treated and code as E12 for PRR (Type 1).
DO/DT	2. Determine material to be used is resin-based sealant.
DSA/HA	3. Prepare all the necessary equipment and materials for PRR (Type 1) treatment.
DO/DT	4. Procedure is conducted in the following steps:
DO/DT	a. Tooth / Teeth coded E 12 must be cleaned with a dry bristle brush in a slow handpiece or with a dry toothbrush. Use of prophylaxis paste or pumice is not required.
DO/DT	b. Cavity preparation is done on pits / fissures of tooth / teeth that is carious and have microcavity using a handpiece. Preparation of cavity must be within the enamel layer of tooth / teeth. However, SOP of normal tooth / teeth restoration must be used if the cavity reaches to the dentin enamel junction (DEJ).
DO/DT	c. Tooth / Teeth coded with E 12 is isolated and dried with two finger technique / cotton rolls to prevent saliva contamination.
DO/DT	d. Acid etching must be done on tooth / teeth surface according to the instruction manual. Tooth / teeth must be rinsed, isolated and dried. Patient must not be allowed to rinse the mouth. Please make sure there is no saliva contamination.
DO/DT	e. Check the tooth / teeth surface. Acid etching of the tooth / teeth must be repeated if the tooth / teeth surface does not appear chalky.
DO/DT	f. Fissure sealant must be flowed into the cavity and the pit and fissures must be sealed with fissure sealant.
DO/DT	g. Cure the sealant according to instruction manual of manufacturer. Please make sure there are no voids.
DO/DT	h. Remove the wet layer with gauze after the curing process. Check the retention of sealant at the occlusal surface and marginal ridges
DO/DT	i. The acid etching and sealant application procedure must be repeated if there is sealant deficiency.
DO/DT	j. The occlusal surfaces are smoothen if there are occlusal disturbances ('catch').

RESPONSIBILITY	ACTION
DO/DT	5. Remove the cotton rolls.
DO/DT	6. Give instructions to patients as follow; <ul style="list-style-type: none"> <li>i) Do not take foods within 1 hour after procedure</li> <li>ii) If any problems arise after treatment;               <ul style="list-style-type: none"> <li>• Go to the government dental clinic (during office hour) or;</li> <li>• Any other nearest dental clinic (after office hour)</li> </ul> </li> </ul>
DO/DT	7. Examination, diagnosis and treatment done must be recorded comprehensively in the LP. 8-1 Pin 8/2019 or in the electronic medical records.

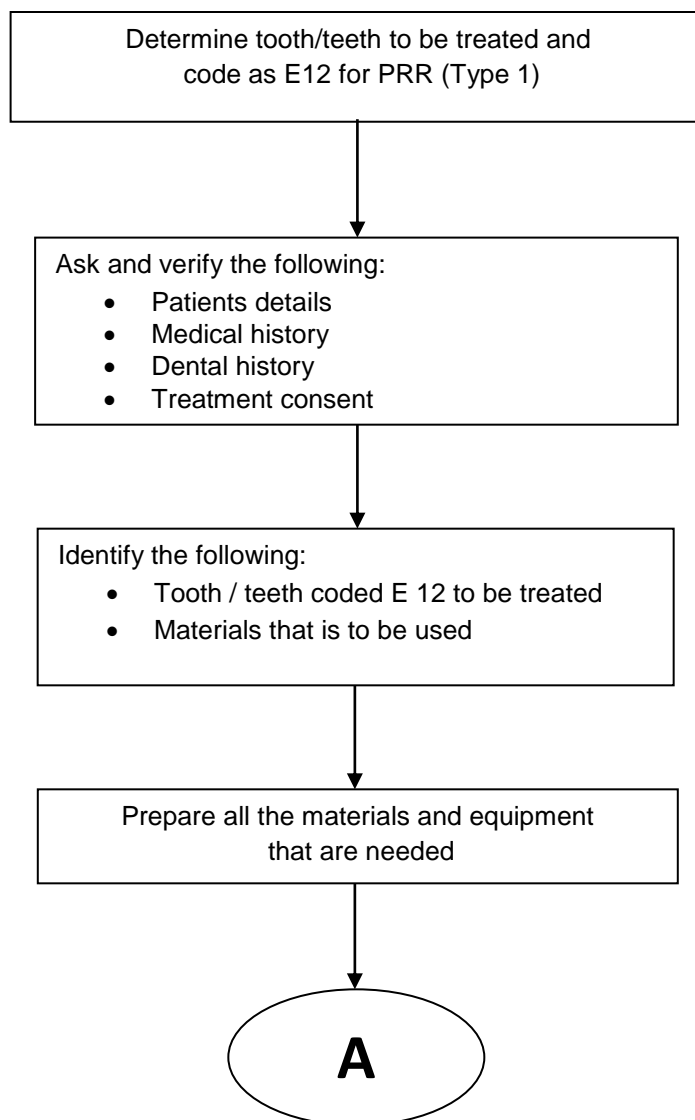
**Abbreviation:**

DO - Dental Officer  
 DT - Dental Therapist  
 DSA - Dental Surgery Assistant  
 HA - Health Assistant

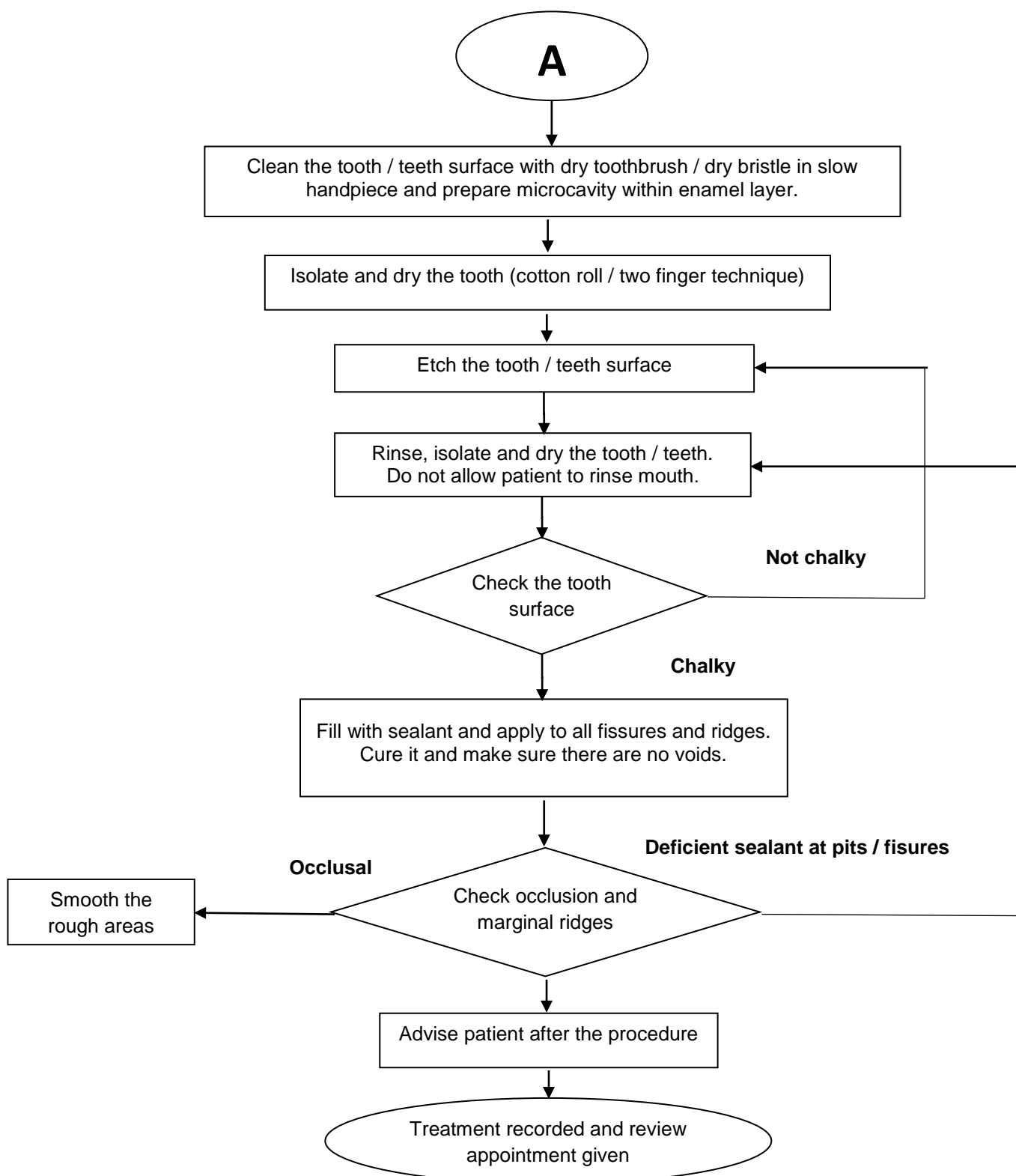
**Appendix 8a**

**FLOW CHART OF SOP FOR PRR (TYPE 1) USING RESIN-BASED SEALANT**

**Stage 1: Preparation Prior to PRR (Type 1) using Resin-Based Sealant**



**Stage 2: Treatment Procedure for PRR (Type 1) using Resin-Based Sealant**



## Appendix 9

**STANDARD OPERATING PROCEDURE OF  
PRR (TYPE 1) USING GIC**

RESPONSIBILITY	ACTION
DO/DT/DSA/HA	1. Determine tooth/teeth to be treated and code as E12 for PRR (Type 1).
DO/DT	2. Determine material to be used is GIC
DSA/HA	3 Prepare all the necessary equipment and materials for PRR Type 1 treatment.
DO/DT	4 Procedure is conducted in the following steps:
DO/DT	a) Tooth / Teeth coded E 12 must be cleaned with a dry bristle brush in a slow handpiece or with a dry toothbrush. Use of prophylaxis paste or pumice is not required. <sup>1</sup>
DO/DT	b) Cavity preparation is done on pits / fissures of tooth / teeth that is carious and have micro cavity using a handpiece. Preparation of cavity must be within the enamel layer of tooth / teeth. However, SOP of normal tooth / teeth restoration must be used if the cavity reaches to the dentin enamel junction (DEJ).
DO/DT	c) Tooth / Teeth coded with E 12 is cleaned using wet cotton pellet, isolated and dried with two finger technique / cotton rolls to prevent saliva contamination.
DO/DT	d) Apply conditioner or GIC liquid into the cavity and on the surface of pit and fissures according to manufacturer's instructions.
DO/DT	e) Rinse the surface of the tooth / teeth immediately using wet gauze to remove excess conditioner. Repeat 2-3 times. The tooth / teeth are dried with clean gauze.
DO/DT	f) Mix the GIC material according to manufacturer's instructions
DO/DT	g) Fill the cavity with GIC and apply the sealant on the pits and fissures of the tooth / teeth surface.
DO/DT	h) Apply petroleum jelly / vaseline / cocoa butter on the tooth surface using index finger with gloves.
DO/DT	i) Compress the mixed GIC into pits and fissures using index finger (press-finger) technique.



RESPONSIBILITY	ACTION
DO/DT	j) Remove excess GIC using a carver
DO/DT	k) Check occlusion using articulation paper and do occlusal adjustments
DO/DT	l) Apply petroleum jelly / vaseline / cocoa butter / varnish on the pits and fissures.
DO/DT	5. Remove the cotton rolls.
DO/DT	6. Give instructions to patients as follow; <ul style="list-style-type: none"> <li>i) Do not take foods within 1 hour after procedure</li> <li>ii) If any problems arise after treatment;             <ul style="list-style-type: none"> <li>• Go to the government dental clinic (during office hour) or;</li> <li>• Any other nearest dental clinic (after office hour)</li> </ul> </li> </ul>
DO/DT	7. Patient's tooth / teeth must be reviewed yearly
DO/DT	8. Examination, diagnosis and treatment done must be recorded comprehensively in LP.8-1 Pin 8 /2019 and electronic medical record

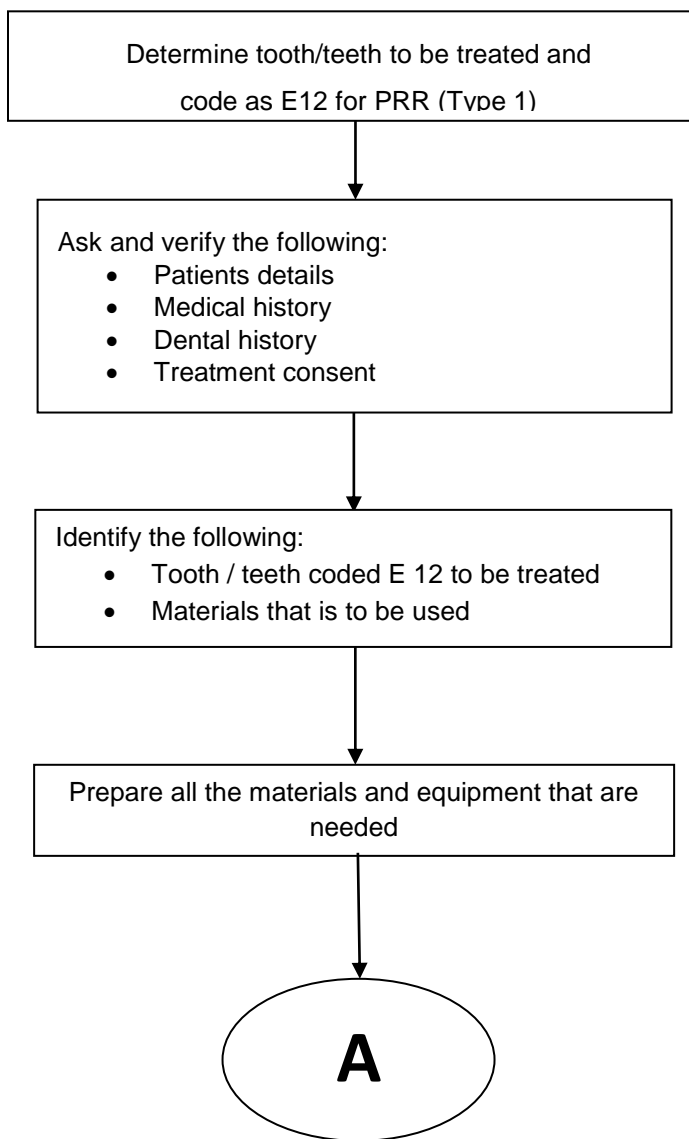
**Abbreviation:**

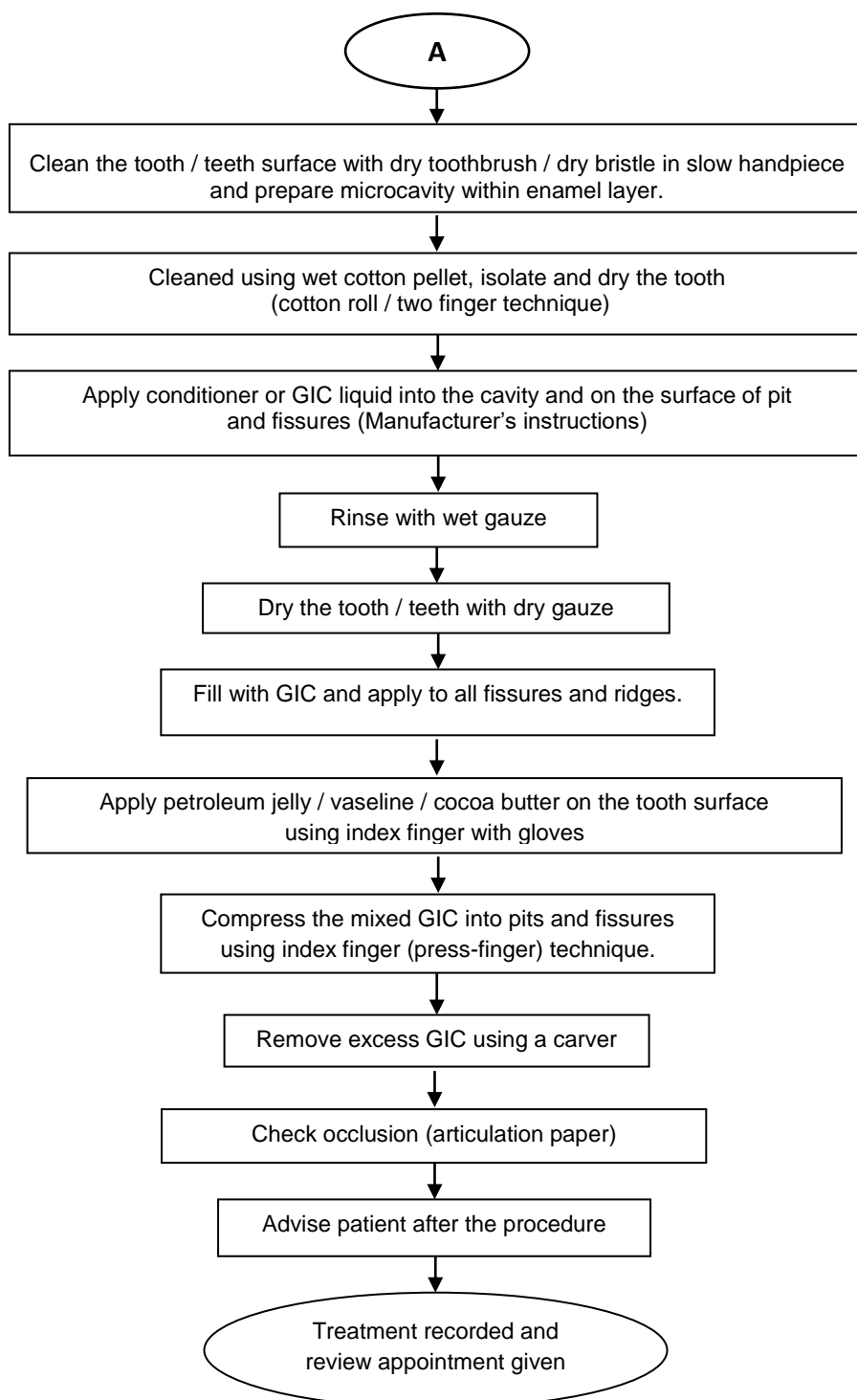
DO - Dental Officer  
 DT - Dental Therapist  
 DSA - Dental Surgery Assistant  
 HA - Health Assistant

**Appendix 9a**

**FLOW CHART OF SOP FOR PRR (TYPE 1) USING GIC**

**Stage 1: Preparation Prior to PRR Type 1 (GIC)**



**Stage 2: Treatment Procedure for PRR, Type 1 (GIC)**

## Appendix 10

**STANDARD OPERATING PROCEDURE OF  
FLUORIDE VARNISH APPLICATION**

RESPONSIBILITY	ACTION
DO/DT	1. Determine tooth/teeth to be treated and code as E13 for FV
DO/DT	2. Check and verify patients' detail. Medical history, allergic history and dental history must be verified and treatment consent must be obtained from patient. <b>FV is contra-indicated for persons with history of allergies or asthma, persons with ulcerative gingivitis or stomatitis</b>
DO/DT	3. Advise patient regarding benefits and safety of fluoride varnish. Fluoride varnish application procedure must be addressed to patients.
DO/DT	4. Patient must be advised to eat / drink prior to fluoride varnish application.
DSA/HA	5. Prepare all the necessary equipment and materials for FV application.
DO/DT	6. It is not necessary to professionally clean the permanent tooth / teeth prior to applying fluoride varnish, but the <b>permanent tooth / teeth coded E13</b> can be cleaned with a wet gauze. Pt must brush the teeth if there is large plaque accumulation on the tooth / teeth.
DO/DT	7. Dry the <b>permanent tooth / teeth coded with E13</b> with compressed air or with cotton gauze before application. Since varnish sets in the presence of moisture, excessive drying is not necessary
DO/DT	8. Tooth / Teeth coded with E13 is isolated with cotton rolls to prevent saliva contamination.
DO/DT	9. When a single-dose system is used, mix the varnish in the well that is provided / according to instruction manual. Apply the fluoride varnish to the tooth / teeth coded with E13 according to the amount that is recommended with a small disposable brush (NHS Scotland) <ul style="list-style-type: none"> <li>i. 5-year-old : do not exceed 0.25ml</li> <li>ii. 6-year-old and above: 0.4 ml to 0.5 ml <sup>1,2</sup></li> </ul>

RESPONSIBILITY	ACTION
DO/DT	10. A specific setting time is not required since varnish sets in contact with saliva. <b>Application of FV must not be done on gingivae / soft tissues / large cavitated tooth and when there is intra oral inflammation.</b>
DO/DT	11. Following advise must be given to patients: a) Do not rinse, eat or drink for at least 30 minutes after FV application b) Eat a soft diet for the rest of the day. c) Patients should avoid brushing teeth the same day. d) Patient must be informed regarding temporary discoloration of tooth / teeth after FV application (few hours).
DO/DT/DSA/HA	12. Ensure patient gets down from dental chair safely
DO/DT	13. Patient's tooth / teeth must be reviewed yearly.
DO/DT	14. Examination, diagnosis and treatment done must be recorded comprehensively in LP.8-1 Pin 8 /2019 and electronic medical record

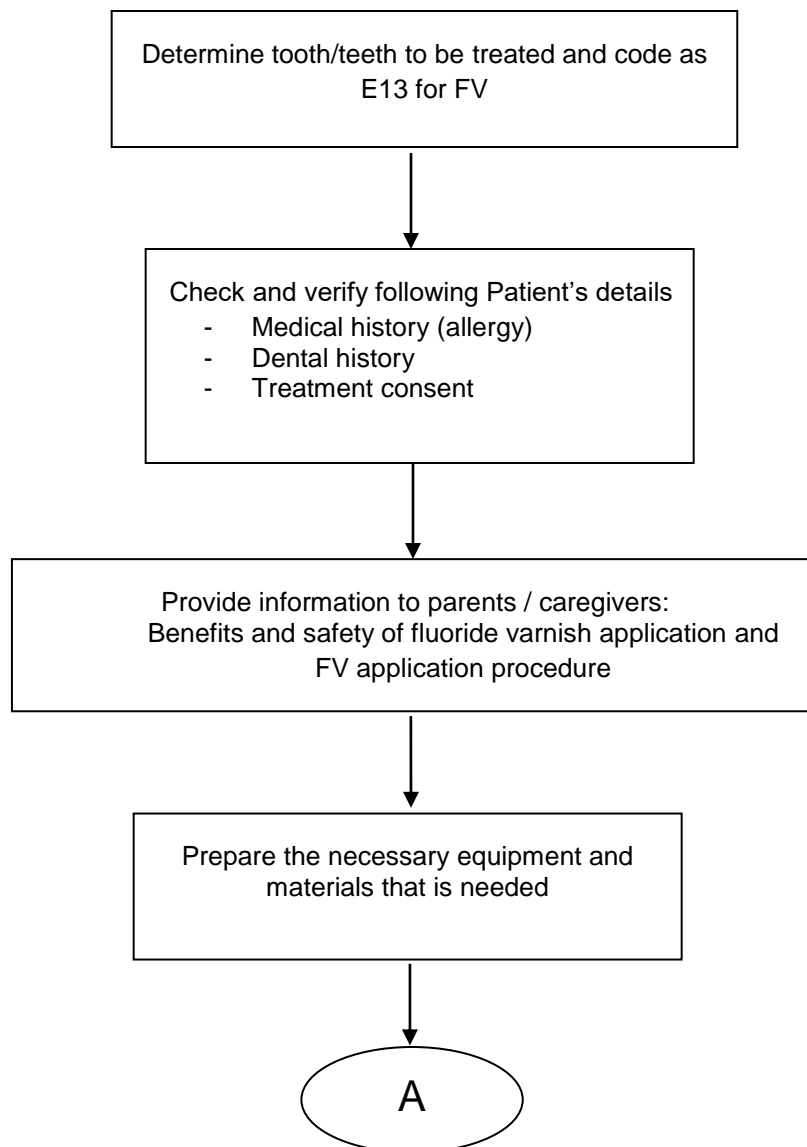
**Abbreviation:**

DO - Dental Officer  
DT - Dental Therapist  
DSA - Dental Surgery Assistant  
HA - Health Assistant

**Appendix 10a**

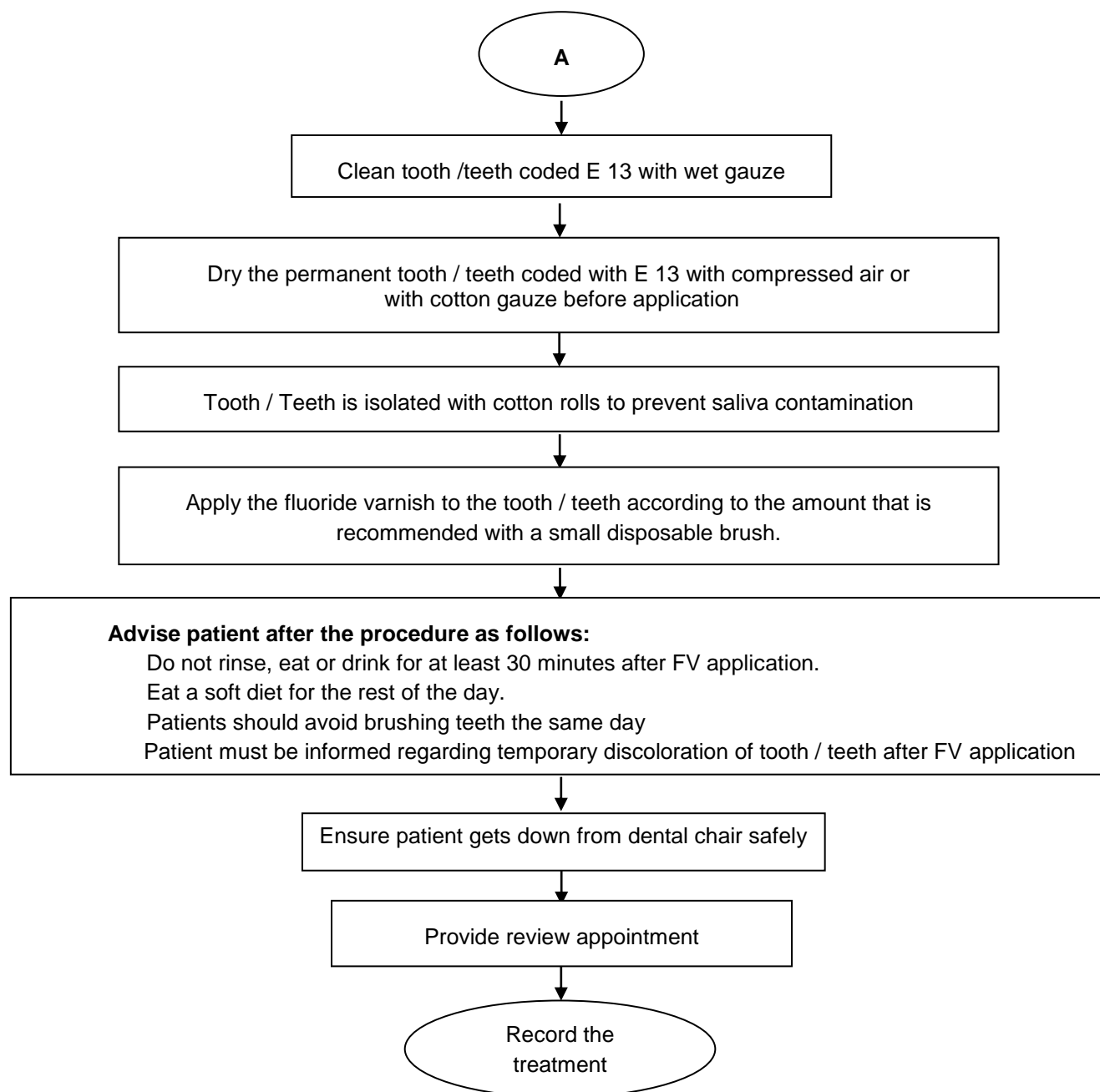
**FLOW CHART OF SOP FOR FV APPLICATION**

**Stage 1: Flow Chart on Preparation Before Fluoride Varnish (FV) Application**



**\* FV is contra-indicated for persons with a history of allergies or asthma, persons with ulcerative gingivitis or stomatitis**

### Stage 2: Flow Chart on Fluoride Varnish Application



#### # NOTE:

Apply the fluoride varnish to the tooth / teeth coded with E 13 according to the amount that is recommended with a small disposable brush (NHS Scotland)

**5 year old** : Do not exceed 0.25ml  
**≥ 6 year old** : 0.4 ml to 0.5 ml

Application of FV must not be done on gingivae / soft tissues / large cavitated tooth and when there is intra oral inflammation

## Appendix 11

CPPC Treatment Need and Treatment Rendered by Year of Preschool/ School Children

CPPC 1/20

Preschool/School/Clinic/District/State: \_\_\_\_\_

Year of Evaluation \_\_\_\_\_

No	CPPC Indicators	Numerator/Denominator	Formula	Pre School		Class (Standard/Form)								Total	
				5 yrs-old	6 yrs-old	1	2	3	4	5	6	Peralihan	KKI		
1	Fissure Sealant Treatment Need	No. of new attendance	a												
		No. of subjects	b												
		No. of teeth	c												
	Fissure Sealant Rendered	% subjects	$b/a \times 100$												
		No. of subjects	d												
		% subjects	$d/b \times 100$												
		No. of teeth	e												
2	PRR (Type 1) Treatment Need	% teeth	$e/c \times 100$												
		No. of subjects	f												
		No. of teeth	g												
	PRR (Type 1) Rendered	% subjects	$f/a \times 100$												
		No. of subjects	h												
		% subjects	$h/f \times 100$												
3	Fluoride Varnish Treatment Need	No. of teeth	i												
		% teeth	$i/g \times 100$												
		No. of subjects	j												
	Fluoride Varnish Rendered	No. of teeth	k												
		% subjects	$j/a \times 100$												
		No. of subjects	l												
4	Caries- free status	% subjects	$l/j \times 100$												
		No. of teeth	m												
	DMFT status	% teeth	$m/k \times 100$												
		No. of caries-free subjects	n												
		% of caries-free subjects	$n/a \times 100$												
DMFT status	No. of DMFT	o													
	Mean DMFT	$o/a$													



## Appendix 11a

CPPC 2/20

Trend data of decayed teeth with occlusal caries in Preschoolchildren / Schoolchildren

Preschool/ School/Clinic/District/State: \_\_\_\_\_

Year of Evaluation: \_\_\_\_\_

Class (Standard/Form)	No. of teeth carious experience (D + F) (Include all teeth)	No. of teeth with occlusal caries experience (D + F)			
		All types (Class I and II)		Class I only	
		n	%	n	%
		1	2	3	3/1 x 100
Preschool 5 yrs-old					
Preschool 6 yrs-old					
1					
2					
3					
4					
5					
6					
<i>Peralihan</i>					
KKI					
JUMLAH					

\*PG 307 (for Year 6 school children only) can be modified to yield these results

In this table, decay(D) **does not include** teeth indicated for extraction (X).

Class I – involving occlusal surface only

Class II – involving occlusal surface + other surfaces







**BORANG ICDAS MMI 1, 2, 3**

BORANG MMI/1/2/3

**Laporan Rawatan Pencegahan Klinikal Pelaksanaan MMI  
(PERINGKAT NEGERI)**

Negeri: **mandatori**  
 Jumlah SR seluruh negeri: **mandatori**  
 Jumlah enrolmen SR seluruh negeri: **mandatori**  
 Jumlah SR yang terlibat MMI: **mandatori**

TAHUN	Kedatangan baru (PG 201A kol 5)	Bil gigi kekal D (PG 201A kol 13)	Min D (e/b)	Bil murid dengan E ≥ 1 (PG 201A kol 20)	Prevalen lesi karies awal (e/b)	Bil murid bebas karies (BK) tetapi E ≥ 1 (PG 201A kol 23)	% murid bebas karies (BK) tetapi E ≥ 1 (g/b)	Perlu dibuat						Telah dibuat						% Murid telah buat rawatan FS (f/f)	% Murid telah buat rawatan FV (f/m)	% Murid telah buat rawatan PRR Jenis rawatan (w/o)	% Gigi telah buat rawatan FS (s/k)	% Gigi telah buat rawatan FV (w/n)	% Gigi telah buat rawatan PRR Jenis rawatan (w/p)		
								Fisur selan		Sapuan fluorida		Restorasi pencegahan (PPR Jenis 4)		Benu (B) Semula (S)	Fisur selan		Sapuan fluorida		Restorasi pencegahan (PPR Jenis 4)								
								Murid (PG 201A kol 30)	Gigi perlu FS (PG 201A kol 31)	Murid (PG 201A kol 33)	Gigi (PG 201A kol 34)	Murid (PG 201A kol 35)	Gigi (PG 201A kol 36)		Murid (PG 201A kol 44)	Gigi (PG 201A kol 45)	Murid (PG 201A kol 46)	Gigi (PG 201A kol 47)	Murid (PG 201A kol 48)							Gigi (PG 201A kol 49)	
a	b	c	d	e	f	g	h	i	j	k	m	n	o	p	q	r	s	t	u	v	w	x	y	z	aa	ab	ac
1			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
2			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
3			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
4			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
5			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
6			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												
JUMLAH			#DIV/0!		#DIV/0!		#DIV/0!	B							B							#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
								S							S												

Disediakan oleh:

Disemak oleh:

Tarikh:

Tarikh:

## Appendix 13

## CHILD STATUS REPORT OF FISSURE SEALANT APPLICATION

**School** Enter the name of the school

**Name of patient** Enter child's name

**Clinic** Enter the clinic responsible for the management of the school

**District/State** Enter the district and state responsible for the management of the school and clinic

**Year / Class** Enter the year and name of the child's class for that year e.g.

Year	2020	2021
Class	Std. 2 A	Std. 3 C

**Initial Application/ Material Used** Record the date of first application. Tick ( / ) whether resin or GIC used.

**Columns 1st to 5th Year Review** Enter the date of subsequent review. Enter the status of the fissure sealant

**Year(s) of review** Enter the date of review e.g. if the initial application is in the year 2020 then the 1st Year Review is in the year 2021, the 2nd Year Review is in the year 2022 and so on. Indicate the status of the fissure sealant and tooth for each year of review.

Status of fissure sealant	<p><b>Use one of the following</b></p> <p><b>Codes I = Intact Sealant</b></p> <p><b>NI = Not Intact, do not require redo</b></p> <p><b>R = Redo/Replace Sealant (see definition below)</b></p> <p><b>F = Failed fissure sealed tooth (see definition below)</b></p>
Failed fissure-sealed tooth	<p>Prevention of caries is considered to have failed when the tooth develops caries on <b>any</b> surface (please indicate the Caries surface). This definition includes the following:</p> <ul style="list-style-type: none"> <li>• The sealant has failed leading to caries.</li> <li>• Prevention of caries has failed when decision to render fissure sealant has not accounted for possible caries occurrence on other surfaces.</li> </ul>
Redo/Replace Sealant	<p>The sealant is deemed to have been totally lost or there is partial loss of sealant with an obvious catch when probed, and requires redo.</p>

**Appendix 13 (continue)**

FS 1/2003  
(Pin.1/20)

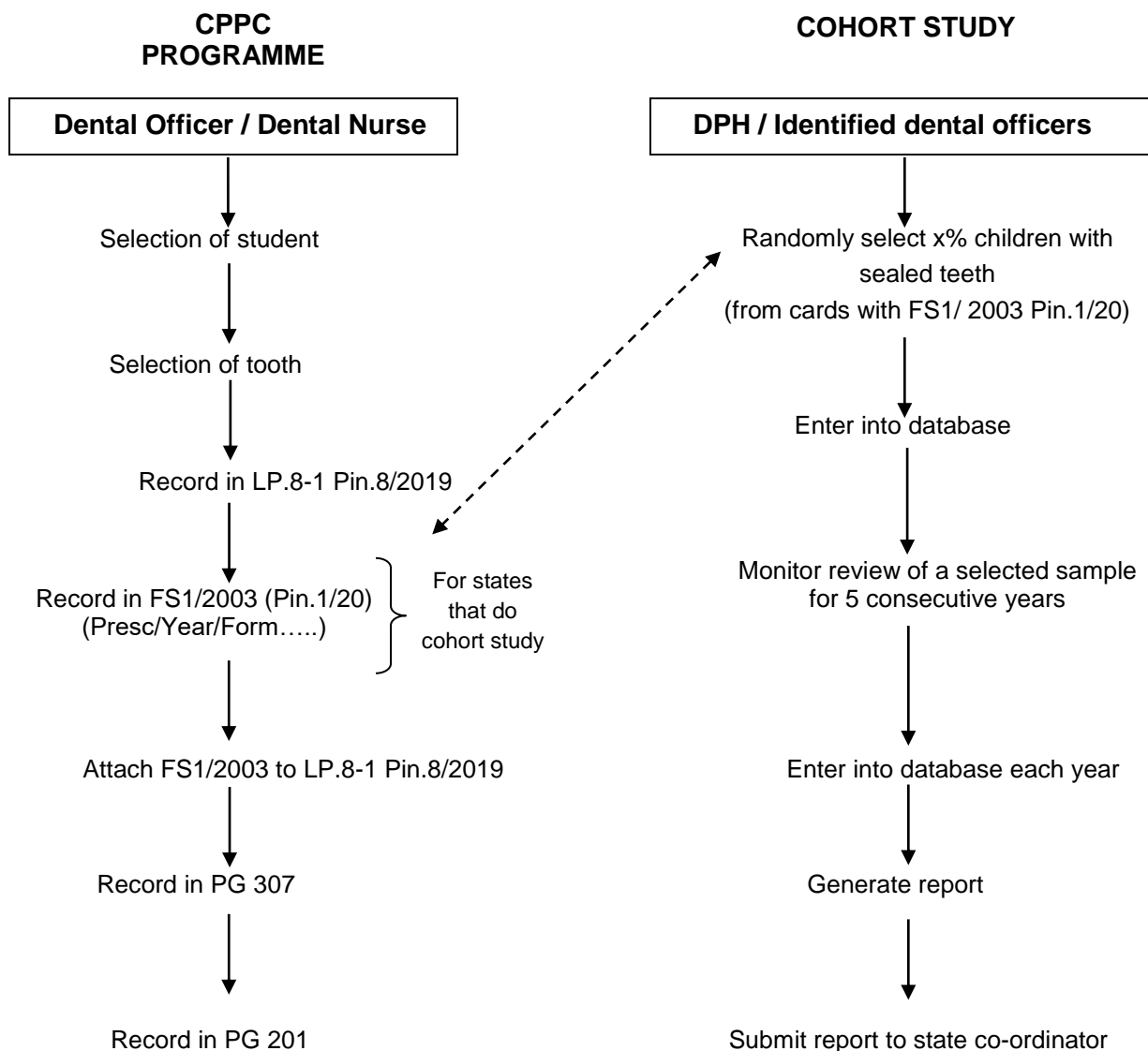
**CHILD STATUS REPORT ON FISSURE SEALANT APPLICATION**

School..... Clinic.....  
Name of Patient..... District/State.....

Year	20.....	20.....	20.....	20.....	20.....	20.....		
Preschool/Class								
Upper teeth	<b>Sealant Application (Record date of application/review and status of FS)</b>							
	<b>Initial Application</b>			<b>Date/Status</b>	<b>Year 1 Review</b>	<b>Year 2 Review</b>	<b>Year 3 Review</b>	<b>Year 4 Review</b>
	<b>Date</b>	<b>Material ( / )</b>						
		<b>Resin</b>	<b>GIC</b>					
			Date					
			Status					
			Date					
			Status					
			Date					
			Status					
Lower teeth	<b>Sealant Application (Record date of application/review and status of FS)</b>							
	<b>Initial Application</b>			<b>Date/Status</b>	<b>Year 1 Review</b>	<b>Year 2 Review</b>	<b>Year 3 Review</b>	<b>Year 4 Review</b>
	<b>Date</b>	<b>Material ( / )</b>						
		<b>Resin</b>	<b>GIC</b>					
			Date					
			Status					
			Date					
			Status					
			Date					
			Status					

Appendix 14

**FLOW CHART FOR DATA COLLECTION: LINK BETWEEN CPPC AND LONGITUDINAL STUDY**





## Appendix 15

GLOSSARY OF TERMS<sup>11</sup>

- |    |                               |  |
|----|-------------------------------|--|
| 1. | Sound tooth/caries free tooth | No evidence of treated or untreated caries on any of its Surfaces  |
| 2. | Early Caries Lesion (E)       | <p>Score as early caries lesion/E if fulfilled with <b>AT LEAST ONE</b> of the criteria<sup>52</sup> below following:</p> <p>a. There is a clear carious opacity (white spot lesion) and / or brown carious discoloration at enamel surface.<br/> <b>At buccal and lingual:</b> usually the lesion is located in close proximity (in touch or within 1 mm) of the gingival margin.</p> <p>b. Localized enamel breakdown due to caries with no visible dentine.</p> <p><b>At pit or fissure:</b> there is a cavity, BUT the dentine is <b>NOT</b> visible in the walls or base of the cavity. If in doubt, a blunt probe can be used gently to confirm the presence of a cavity. This is achieved by sliding the probe along the suspect pit or fissure and a limited discontinuity is detected if the tip probe drops into the surface of the enamel cavity.</p> <p><b>At smooth surface:</b> there is distinct loss of enamel integrity, viewed from the buccal or lingual direction. If in doubt, a blunt probe can be used gently across the surface to confirm the loss of surface integrity.</p> <p>c. Presence of deep and/or complex pattern(s) of pits and fissures.</p> |

<sup>52</sup> International Caries Detection and Assessment System (ICDAS) Coordinating Committee. Criteria Manual. International Caries Detection and Assessment System (ICDAS II). Workshop held in Baltimore, Maryland, March 12th-14th 2005

- 
- |    |   |  |
|----|---|--|
| 3. | Caries                                  | A tooth is deemed to be carious if <ul style="list-style-type: none"><li>• there is a lesion in a pit or fissure, or a smooth tooth surface, which has a detectable softened floor, softened wall or undermined enamel; or</li><li>• there is a discoloration due to underlying caries (clinical judgement); or</li><li>• it has a temporary filling or a dressing; or</li><li>• it has a partially or fully dislodged filling with signs of secondary caries.</li></ul> |
| 4. | Failed fissure sealed/PRR type 1 tooth  | A tooth that has developed caries on any surface after placement of sealant. Check for softened areas, discoloration and undermined enamel.  |
| 5. | Intact fissure sealant/PRR type 1       | No discontinuity can be detected with a probe (Probe 9) between the margins of the sealant and the occlusal surface of the tooth   |
| 6. | Not intact fissure sealant/PRR type 1   | Sealant not in place but does not require a redo according to operator's clinical judgement  |
| 7. | Redo/replace fissure sealant/PRR type 1 | A tooth with a sealant not intact/partially lost and according to operator's clinical judgement is at risk to caries.<br><br>Any child with a redo sealant will be a new case for the year   |
| 8. | Wet layer                               | Refers to the remnant unpolymerised layer after sealant polymerisation.  |