CLINICAL PRACTICE GUIDELINES

MANAGEMENT OF SEVERE EARLY CHILDHOOD CARIES

2nd Edition
2012

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STATEMENT OF INTENT

These clinical practice guidelines are meant to be a guide for clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not necessarily ensure the best outcome in every case. Every healthcare provider is responsible for the management of his/her unique patient based on the clinical picture presented by the patient and the management options available locally.

REVIEW OF THE GUIDELINES

These guidelines were first issued in 2005 and revised in 2012. The next review of these guidelines will be in 2016 or sooner if new evidence becomes available.

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Electronic version available on the following websites:
http://www.moh.gov.my
http://www.ohd.gov.my
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LEVELS OF EVIDENCE

LEVEL	STUDY DESIGN
I	Evidence obtained from at least one properly designed randomized controlled trial (RCT)
II-1	Evidence obtained from well-designed controlled trials without randomization
II-2	Evidence obtained from (RCT)-designed cohort or case-control analytic studies, preferably from more than one centre or research group
II-3	Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence
III	Opinions or respected authorities, based on clinical experience; descriptive studies and case reports; or reports of expert committees

Source: Adapted from U.S./Canadian Preventive Services Task Force

GRADES OF RECOMMENDATION

A	At least one meta analysis, systematic review or RCT or evidence rated as good or directly applicable to the target population
B	Evidence from well conducted clinical trials, directly applicable to the target population and demonstrating overall consistency of results; or evidence extrapolated from meta analysis, systematic reviews or RCT
C	Evidence from expert committee reports, or opinions and or clinical experiences of respected authorities; indicates absence of directly applicable clinical studies of good quality

Source: Modified from the Scottish Intercollegiate Guidelines Network (SIGN)

Note: The grades of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

DEVELOPMENT AND OBJECTIVES

GUIDELINES DEVELOPMENT

The Development Group for this Clinical Practice Guideline (CPG) consisted of paediatric dental specialists, academics and dental public health specialists. The Review Committee was actively involved in the development process of this guideline.

The previous edition of the CPG on Management of Severe Early Childhood Caries was first published in 2005 and since then, there has been new evidence on diagnosis and management of this condition. This revision aims to include more target groups and give a greater emphasis on caries risk assessment and prevention of early childhood caries. The key elements of this revised CPG are improvements to the general text, photographic updates, and simple messages based on up-to-date evidence and treatment approaches.

Literature search was carried out at the following electronic databases: PUBMED/MEDLINE, SUMSearch, Trip Database, Cochrane Database of Systemic Reviews (CDSR), Journal full text via OVID search engine and Database of Abstracts of Reviews of Effectiveness (DARE). The following free text terms or MeSH terms were used either singly or in combination to retrieve the articles: tooth, dental, decay, caries, rampant, bottle, nursing, baby and child. All searches were conducted between March 2010 and August 2011 and only literatures in English were retrieved. In addition, reference was also made to other guidelines on Early Childhood Caries e.g. American Academy of Paediatric Dentistry 2009, European Academy of Paediatric Dentistry 2008 and Scottish Dental Clinical Effectiveness Programme. These CPGs were evaluated using the Appraisal of Guidelines for Research and Evaluation (AGREE) prior to them being used as references.

This CPG is largely based on the findings of systematic reviews, meta-analyses and clinical trials. The levels of evidence of the literature were graded using the adapted version of United States/Canadian Preventive Services Task Force Level of Evidence, while the grading of recommendations was based on the modified version of the Scottish Intercollegiate Guidelines Network (SIGN).

Clinical questions were developed under six major subtopics and members of the review group were assigned individual questions within these subtopics. Relevant literature retrieved were appraised by at least two members and presented in the form of evidence tables and discussed during review group meetings. All statements and recommendations formulated were agreed by the review group and where evidence was insufficient; recommendations were made based on consensus of the group members.

Although, ideally patient views and preferences should be considered in the development of CPGs, in this instance, it was not considered feasible. Nevertheless, patient information leaflets would be developed to facilitate the dissemination of important information to the public.

The draft guidelines were reviewed by a team of external reviewers and posted on the Ministry of Health, Malaysia website for comments and feedbacks. These guidelines were presented to the Technical Advisory Committee for CPG, and finally to the HTA and CPG Council, Ministry of Health, Malaysia for approval

OBJECTIVE

To provide evidence-based guidelines in the management of severe early childhood caries for the best possible outcomes.

CLINICAL QUESTIONS

The clinical questions for these guidelines are:

1. What are the causes of severe early childhood caries (S-ECC)?
2. What are the clinical presentations of S-ECC?
3. What are the methods used for diagnosis of S-ECC?
4. What factors are useful to identify children at risk of S-ECC?
5. What are the methods for preventing S-ECC?
6. What are the principles of management of S-ECC?

TARGET POPULATION

These guidelines are applicable to children who are potentially at risk of developing early childhood caries (ECC) and those diagnosed with S-ECC.

TARGET GROUP/USER

These guidelines are developed for the use of all healthcare professionals involved in the care of young children such as:

- Dental Nurses
- Medical Nurses
- Dental Practitioners
- Medical Practitioners
- Paediatric Dentists
- Paediatricians
- Dietitians

HEALTHCARE SETTINGS

Dental Clinics, Health Clinics, Maternal and Child Health Clinics and community settings are the common areas of use of these guidelines.

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MEMBERS OF THE REVIEW COMMITTEE

These guidelines were reviewed by a panel of independent reviewers from both public and private sectors who were asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence supporting the recommendations.

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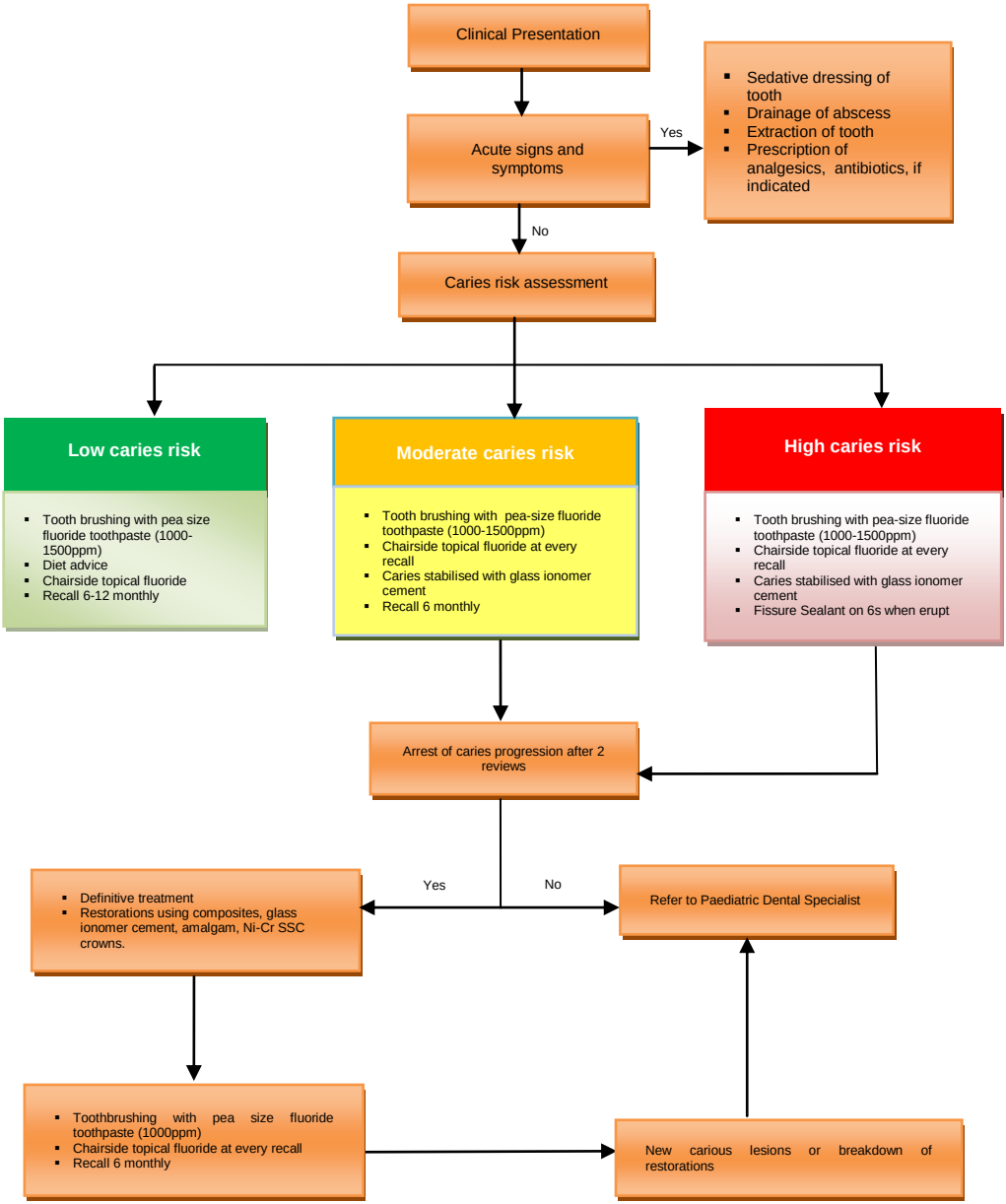
ALGORITHM FOR THE MANAGEMENT OF SEVERE EARLY CHILDHOOD CARIES



	GLOSSARY
Dental caries	Destruction of tooth structure caused by acid produced by bacteria.
Active caries	Carious lesion which is progressing and is characterized by chalky white appearance of enamel and yellow coloured soft dentine.
Arrested caries	Carious lesion that is no longer progressive. Yellow, brown to dark brown enamel lesion that is hard to probing.
Incipient caries	Early stage of carious lesion, best seen on the smooth surface of teeth, visible as a white spot.
Severe early childhood caries	Any sign of dental caries on any tooth surface during the first 3 years of life. The decay pattern usually involves the deciduous upper maxillary tooth and the upper and lower deciduous molars. The lesions are usually suddenly appearing, widespread and rapidly involve the tooth pulp.
Decayed/missing/ filled teeth (dmf)	dmf describes the amount or prevalence of dental caries in an individual (d - decayed , m - missing, f – filled,) The sum of the three figures forms the dmf-value which numerically expresses the caries prevalence. For example: dmf of 4, 3, 9 =16 means that 4 teeth are decayed, 3 teeth are missing and 9 teeth have fillings.

1. INTRODUCTION

Dental caries is a biofilm (plaque)-induced acid demineralisation of enamel or dentine, mediated by saliva.[1] level III The development of the carious lesion is episodic, with periods of demineralisation alternating with periods of remineralisation.

1.1 Early Childhood Caries (ECC)

Dental caries in children is typically first observed clinically as a "white spot lesion." If the tooth surface remains intact and non-cavitated, then remineralisation of the enamel is possible. If the subsurface demineralisation of enamel is extensive, it eventually causes the collapse of the overlying tooth surface, resulting in a "cavity". The disease, ECC is referred to the presence of 1 or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in a child under the age of 6. In children younger than 3 years of age, any sign of smooth surface caries is indicative of severe Early Childhood Caries (S-ECC).[2] level III From ages 3 to 5, the severity of ECC can be classified according to dmf scores **(Table 1).**

Table 1. Guide to Assigning S-ECC Status by Age

Age (years)	S-ECC status
<3	Any sign of smooth surface caries
3	dmf ≥4
4	dmf ≥5
5	dmf ≥6

1.2 Severe Early Childhood Caries (S-ECC)

S-ECC describes dental caries in the primary dentition of young children that occur abruptly, spreading widely and rapidly and is burrowing in nature resulting in early involvement of the dental pulp. It has also been referred to as rampant caries, nursing bottle caries and baby bottle tooth decay. Consequences of S-ECC include a higher risk of new carious lesions,[3-6 level II-2] hospitalizations and emergency room visits[7-10 level III], increased treatment cost and time,[11-12 level III] risk for delayed physical growth and physical development,[13-14 level II-1] loss of school days and increased days with restricted activity[15-17 level II-2] and a diminished ability to learn.[18-20 level II-3] Oral health-related quality of life (QOL) has also been shown to be significantly correlated with ECC; children with ECC had significantly worse oral health-related QOL than caries free children.[21 level II-2]

1.3 Epidemiology

Epidemiologic data in Malaysia indicates that ECC continues to be a major challenge. Caries prevalence among 6-year olds remains high, with only a small decline from 80.9% in 1997 to 74.5% in 2007.[22] level II-2 Among 5 year olds, the caries prevalence was 76.2% with a mean decayed, missing, and filled teeth (dmft) score of 5.6. About 55.8% of 5 year-olds had 3 or more deciduous teeth affected by caries whilst 25.3% had dmft ≥10.[23] level II-2

In the US, national surveys show that ECC was highly prevalent and increasing among poor preschool children and was largely untreated in children under age 3. Those children with caries experience have been shown to have high numbers of teeth affected.[24] level III Similarly, in the UK, sizable groups of 5-year-old children have clinically significant ECC. In general, although overall caries prevalence is decreasing, the disease level in pre-school children has not decreased consistently. Significant groups within the population remain in need of oral healthcare.[25] level III

1.4 Clinical Characteristics

The clinical pattern of ECC is rampant.[2 Level III] Characteristically, caries usually affect the primary teeth in the following sequence:

Maxillary central incisors → Maxillary lateral incisors → Maxillary 1st molars → Maxillary canines and second molars → Mandibular molars → Mandibular canines and incisors (**Table 2 and Fig 1- Fig 3a - d**).

Table 2. Stages of Early Childhood Caries

Severity	Features
Mild to Moderate (Fig. 1)	• White spot lesions • Carious lesions involving the incisors and molars
Moderate to Severe (Fig. 2)	• Labiolingual carious lesion affecting the maxillary incisors with or without molar caries • Mandibular incisors unaffected
Severe (Fig. 3 a -c)	• Carious lesions involve almost all the teeth, including mandibular incisors • Rampant

Fig 1. Mild Early Childhood Caries

Fig 2. Moderate Early Childhood Caries

Fig 3a. Severe Early Childhood Caries

Fig 3b. Severe Early Childhood Caries (Maxilla)

Fig 3c. Severe Early Childhood Caries (Mandible)

2. CARIES RISK

Dental caries is a transmissible infectious disease and understanding the acquisition of cariogenic microbes improves preventive strategies. Certain risk factors, behaviours or habits that give cause for prolonged presence of fermentable cariogenic substrates, or a high oral cariogenic bacterial count may cause the child to be at risk for dental decay.

2.1 Risk Factors

The causes of caries are multi-factorial, and the individual risk factors associated with ECC are therefore not necessarily causative. The Fisher-Owen diagram[26 Level III] (Fig 4) summarizes the complicated interaction between oral health influenced by environment at child, family and community levels.

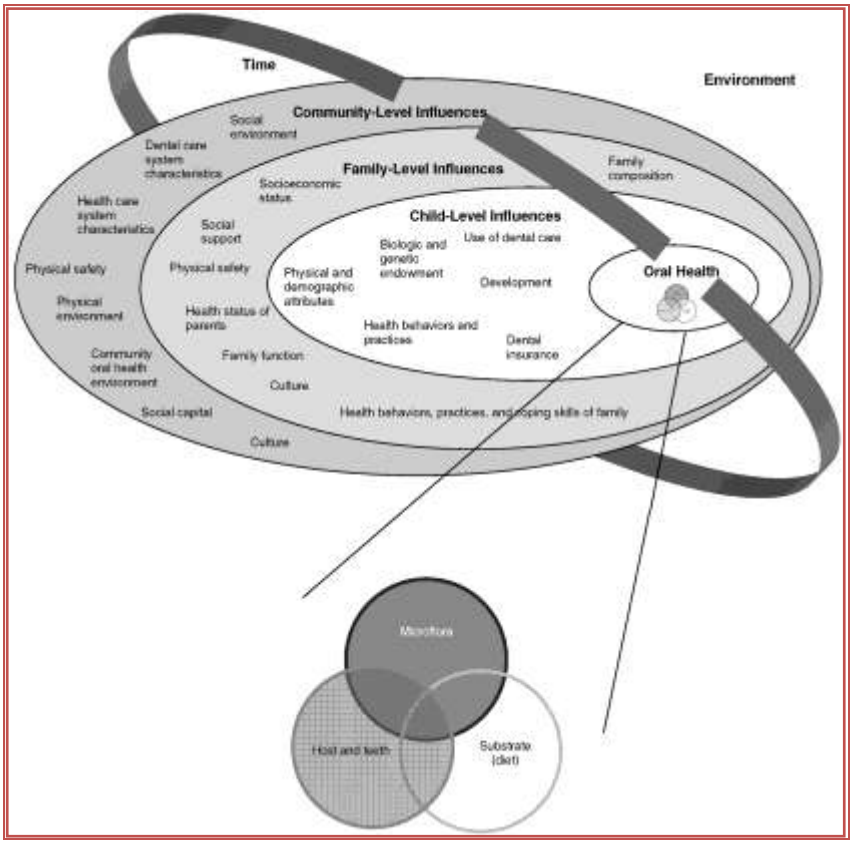


Fig 4. Child, family, and community influences on oral health outcomes of children (Fisher-Owens).

The following is a list of some of the major factors

i. Dietary Habits

High frequency consumption of sugary foods and drinks are risk indicators for caries.[27-28 level I]

ii. Bottle feeding

Frequent bottle feeding with sucrose-containing infant feed, especially night time, is a risk indicator for caries in young children.[29 level III]

iii. Socio economic status

Children who live under poor economic circumstances, belong to ethnic and racial minorities, have single mothers and parents with low education have increased prevalence to ECC.[30 level III]

iv. Mutans Streptococci (MS)

MS maybe transmitted vertically from mother to child through salivary contact. Infants with high levels of MS or those with early colonization are more likely to develop ECC.[31-33 level I] Children whose mothers have good oral hygiene have a lower risk of maternal transmission of Mutans Streptococci (MS) and childhood dental caries.

v. Plaque

Visible plaque is strongly associated with ECC. Highest incidence of caries was found among children who did not brush their teeth.[34 level II-2]

vi. Early Caries Experience

Children with early caries development exhibit high caries progression as well as a high risk for further development of an extensive number of new carious lesions.[35 level II-2]

2.2 Protective Factors

These are factors that can help arrest or reverse dental caries.

i. Breast feeding

Breast feeding provides the best nutrition for babies.[36 level I] There is no effect of breast feeding on early childhood caries.[37 level]

ii. Fluorides

Children living in a fluoridated community or have exposure to fluoridated toothpaste have lower risk of dental caries.[38-39 level I]

iii. Regular dental care

Children with regular dental care have lower caries risk.[40 level II-3]

2.3 Caries Risk Assessment

Effective dental care requires early identification of children at high risk for dental caries, so that they may receive early and intensive intervention. The goal of caries risk assessment is to deliver patient-specific diagnostic, preventive, and restorative services – based on the needs of each individual child. Conducting caries risk assessment can potentially identify those at risk even before manifestation of carious lesions.[41 level II-3]

The risk factors are assessed by an interview with the parent and clinical examination of the child. A risk assessment categorisation of low, moderate or high is based on a preponderance of the risk factors.

(Refer to **Appendix I** for Caries-risk Assessment Form for 0 – 3 Year Olds and **Appendix II** for Caries-risk Assessment Form for 0 – 5 Year Olds)

RECOMMENDATION

- Caries risk assessment should be done for all infants and young children for early identification and treatment planning (Refer Appendix 1 & 2)

Grade A

3. DIAGNOSIS

Diagnosis of early childhood caries is both by visual and clinical examination of children who are at risk.

3.1 Visual and Clinical Examination

Reliable clinical diagnosis and recording of carious lesions and restorations can be achieved if the teeth are clean and dry. The initial appearance of ECC is the presence of opaque white spots which usually starts at the cervical third of upper anterior teeth. It could then affect the occlusal of upper deciduous molars, upper canines followed by lower deciduous molars, lower canines and lower incisors progressing into yellowish brown carious lesions.[41 level II-3] In advanced S-ECC, the lesion may progress to expose pulp tissue and breakdown as retained roots.

A full mouth clinical examination is carried out by a thorough visual examination with a good light source and a dry field. If there is any gross plaque deposit, they should be removed by wiping the surface with gauze. Dental examinations by visual inspection with the aid of plane mouth mirrors are the most useful for diagnosing carious lesions. Probing is not an acceptable method for diagnosing caries in pits and fissure, but may be useful when assessing caries activity in exposed dentine. Diagnosing gross caries in children with conventional

methods such as visual and tactile examination is usually sufficient.[42-43 level I]

3.2 Radiographic Examination

The broad contact points of the primary dentition make diagnosis of approximal caries difficult. Therefore, bitewing radiographs (Fig.5) are an important adjunct in detecting proximal caries for children age four and above.[44-45 level III] If a child is uncooperative for bitewings, a bi-maxillary oblique lateral view may be obtained. Orthopantomograms are not routinely used for caries diagnosis.

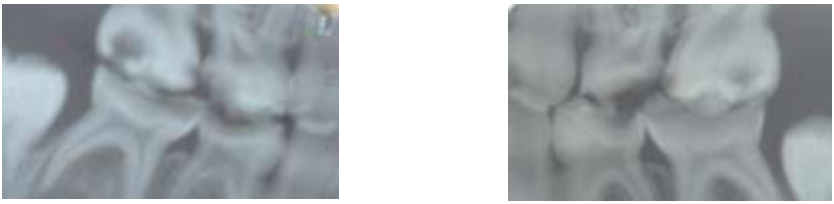


Fig 5. Bitewing radiographs

3.3 Other Investigations

Although salivary flow rate and salivary buffering capacity are said to influence the development of dental decay, it is not recommended to routinely investigate this in the diagnosis of ECC.

Typical clinical presentation of S-ECC can alert the parents, caregivers and other health personnel during their regular

contact within the non-dental setting. Lift the lip technique should be done once a month at home to look for early signs of tooth decay on the surfaces of upper front teeth.[46 level III]

RECOMMENDATION

- Lift the lip once a month to look for early signs of decay on the surfaces of upper front teeth

- Dental examination should be carried out by visual inspection with the aid of plane mouth mirrors to identify caries

Grade A

4. PREVENTION

The aims of prevention are targeted at a) early identification of patients who are at risk of ECC so that preventive measures can be instituted, b) preventing the progression of dental caries in children who are diagnosed with S-ECC and c) preventing the recurrence of dental caries in children who have been diagnosed with severe ECC.

The prevention of S-ECC requires a multi-factorial approach due to its various etiological factors as summarized below:

i. Good dietary practice guidelines should be given to new mothers to prevent ECC.[47 level I]

ii. Healthcare workers must prescribe sugar-free liquid medicines whenever appropriate.[48 level III]

iii. Toothpastes with fluoride concentration of 1000 ppm and above are efficacious in preventing caries. Children under 3 years should use a smear of toothpaste whilst those aged 3-6 years should use a pea sized amount of toothpaste.[49-50 level I,]

iv. For high risk young children, a small amount of resin based fluoride varnish can be applied at intervals of 3 months or 6 months.[51 level III]

v. Reinforce oral hygiene measures to reduce plaque and transmission of cariogenic bacteria.[52 level I]

vi. Collaboration with parents and other healthcare providers to ensure all infants and toddlers have access to dental screenings, counseling, and preventive procedures.[53 level I]

vii. Encourage early dental visits within 6 months of eruption of the first tooth and no later than 12 months of age to conduct a caries risk assessment which can potentially indicate those at risk even before manifestation of carious lesions.[40 level II-3]

viii. Children with special healthcare needs should be referred to a dental practitioner upon diagnosis in order that early diagnosis and preventive measures may be instituted.[54 level III]

RECOMMENDATION

- Maintenance of good dietary practices, good oral hygiene control as well as the use of fluoridated toothpaste are recommended for prevention of ECC

Grade A

5. MANAGEMENT

The management of S-ECC is affected by the extent of the carious lesions and the compliance of the child and parent.

5.1 Control of the Carious Process

An individualized caries risk assessment is the first important step in the management of S-ECC. It aims to modify the risk factors as discussed in the previous section.

Parents should be asked to wean off the child from using a bottle while in bed. In case of considerable emotional dependence on the bottle, suggest the use of plain water. In addition, parents are instructed to brush child's teeth last thing at night with fluoride toothpaste.[49 level I] For children aged 3-6

years, chair-side topical fluoride varnish (2.2% F) application to teeth (Fig 6) should be carried out twice yearly.[55 level I]

Fig 6. Fluoride Varnish Application

5.2 Stabilization of carious lesions

The second stage of management would involve stabilization of lesions. If the carious lesion is arrested, it should be monitored to ascertain that it remains in non-progressive stage until exfoliation.[56 level II-2] For non-cavitated proximal enamel lesions, a resin infiltration system used in conjunction with fluoride can be used to control caries progression on deciduous molar teeth.[57 level II-1]

Teeth that require temporization are excavated with spoon excavators and glass ionomer cement (Fig.7) is used to seal the teeth. Temporization by sealing of the carious cavity after

caries removal reduces the load of bacterial colonization in tooth.[58] level I

Fig. 7 Caries Stabilization with Glass Ionomer Cement

When undertaking temporization, evidence shows of that sealing of partially excavated dentine caries is capable of arresting lesion progression, suggesting that complete dentine caries removal is not essential to control caries progression.[59] level II-2

5.3 Restorative Treatment

Restorative treatment of ECC is based on removal of caries and the treatment approach taken should take into consideration the child's risk factors and age.[60] level III In addition, the choice of restorative material used can be influenced by a)

site and extent of decay b) child's ability to cooperate c) longevity of the restoration.[61 level III]

The most commonly used materials used in restoring primary teeth are described in the table below.

Table 3: Advantages and Disadvantages of Restorative Materials

	Advantages	**Disadvantages**
Amalgam	Simple Quick Cheap Technique insensitive Durable	Not adhesive Requires mechanical retention in cavity Environmental and occupational hazards Public concerns
Composite	Adhesive Aesthetic Reasonable wear properties Command set	Technique sensitive Rubber dam required Expensive
Glass Ionomer cement (packable)	Adhesive Aesthetic Fluoride leaching	Brittle Susceptible to erosion and wear
Resin modified glass ionomer	Adhesive Aesthetic Command set Simple to handle Fluoride release	Water absorption Significant wear
High-viscosity glass Ionomer	Adhesive Aesthetic Simple to handle Fluoride release High compressive strength and wear resistance	Water absorption Colour not as good a match as composite resins, compomers and other GICs Poorer mechanical properties than compomer and composites
Polyacid-modified composite resin	Adhesive Aesthetic Command set Simple to handle Radiopaque	Technique sensitive Less fluoride release than GICs
Stainless steel crown	Durable Protect and support remaining tooth structure	Extensive tooth preparation Patient co-operation required Unaesthetic

Adapted from Handbook of Pediatric Dentistry by Angus C Cameron and Richard P Widmer, Third Edition,2008 [62 level III]

There are no significant differences in the materials for outcomes as there are not enough clinical trials to support any particular material.[63 level I] However, studies on longevities of restorations tend to favour SSC[64 level III] and amalgam over the resin based materials.[65 level II] In young children with high risk of caries, there is good evidence that stainless steel crowns (Fig.8) function better than multi-surface intra-oral restorations. [64 level III]

Fig.8 Stainless Steel Crown Restorations

Alternatively, the Hall technique, a simplified method of managing carious primary molars using preformed metal crowns cemented with no local anaesthesia, caries removal or tooth preparation has showed favourable outcomes for pulp health and restoration longevity than conventional restorations. [66 level I]

(Refer to **Appendix III** for Recommended Caries Management Protocol for 1-2 Year Olds and **Appendix IV** for Recommended Caries Management Protocol for 3 - 5 Year Olds). [67, level III]

5.4 Extraction

For teeth that are pulpally involved, the clinician may decide to conduct endodontic treatment or extraction. Extraction of primary teeth is one of the treatment options in managing children with S-ECC although the clinician should try to avoid dental extractions during the child's first visit. The decision to extract should only be made after considering both general and local factors below.[68 level III]

General factors

- Patient's cooperation
- Medical condition
- Dental infection - may increase patient's morbidity

Local factors

- Restorability
- Extent of caries which may involve the pulp and roots
- Potential for malocclusion of disturbances in development of the dentition - balancing and compensating extractions may be considered

5.5 Treatment under General Anaesthesia

If the child is unable to be compliant during dental treatment, or if the child requires extensive treatment, then the use of general anaesthesia (GA) may be considered. Outcome of treatments related to quality of the restorations performed under GA are better than sedation for all parameters examined.[69 level II-3]

Evidence suggests that comprehensive treatment appears to reduce the bacterial load within the oral cavity and full mouth rehabilitation under general anaesthesia (Fig.9) produced a statistically significant decrease in MS levels for at least three months.[70 level II-3] Oral rehabilitation coupled with regular application of 10% povidone iodine application can be a good alternative to control dental caries in children affected with ECC.[71 level I]

Fig.9 Comprehensive Dental Treatment under General Anaesthesia

5.6 Prognosis

Aggressive dental surgery for ECC does not always result in acceptable clinical outcomes as there is still risk for relapse.[72] level II-2 Despite aggressive treatment of ECC, studies have shown some patients do develop new carious lesions within 2 years.[73-74] level III It has also been shown that patients who fail to attend their immediate follow-up appointments may be more likely to experience a relapse.

RECOMMENDATION

- Active carious lesion should be temporized with Glass Ionomer Cement to control caries progression
- For children with high caries risk or multi-surface lesions, the use of stainless steel crowns is recommended.
- Non compliant children with S-ECC should be managed with comprehensive treatment under general anesthesia

Grade B

5.7 Recall and Follow-Up

Children with S-ECC must be reviewed to detect any changes. Recall intervals are based on the outcome of their caries risk assessment:

- Children with obvious signs of active oral disease or its predisposing factors should be reviewed at 3 monthly intervals until well controlled

Recall visit of high caries risk children should be based on the clinician's assessment of the child's caries risk status using the Caries Risk Assessment checklist, and should not exceed 12 months.[75 level III]

RECOMMENDATION

- Children with S-ECC must be recalled according to intervals based on the outcome of their caries risk status

Grade A

6. IMPLEMENTING THE GUIDELINES

This section provides advice on the resource implications associated with implementing the key recommendations and advice on proposed clinical audit indicators for quality management to aid implementation.

Implementation of these CPG is an essential part of clinical governance. It should cater to the local health clinics and community based on both economic and non-economic considerations. Mechanisms should be in place to review the existing healthcare system as compared to the CPG recommendations. Any differences should be assessed and addressed appropriately.

Important issues that should be considered when implementing these CPG are:

- Establishment of an early childhood oral health programme
- Adequate training of healthcare providers, parents and carers to identify S-ECC
- Coordinated referral system and availability of resources for necessary treatment

6.1 Existing facilitators and barriers in applying recommendations

The implementation of the CPG will be facilitated by strengthening the existing early childhood oral health programme and focusing on the CPG Training module for healthcare providers, parents and carers. The module involves the training of Maternal and Child Health Nurses, Medical Officers, assistant medical officers and Paediatricians. The

development group will ensure that the contents of the training module will be in tandem with the recommendations in the CPG.

There are 3 barriers in applying recommendations of the CPG in the local context:

1. Patient factors
    - Lack of awareness of the possible problems associated with S-ECC as they are thought of as “temporary teeth”

2. Healthcare professional factors
    - Limited human resources, especially dental nurses who are multi-tasking
    - Difficulty in the management of very young children
    - Limited knowledge among non-dental healthcare providers

3. Health services factors
    - Lack of linkages between services and providers

With the availability of these evidence based CPGs, the current management will be strengthened to reduce the occurrence of S-ECC.

6.2 Potential resource implications in applying recommendations

In implementing the CPG, the development group recommends strengthening of the existing training module on management of S-ECC. Adequate human resource, especially dental nurses are required.

The development group proposes the following clinical audit indicator for quality management to ensure the implementation of recommendations in the CPG:

$$\text{\% of patients who develop new caries* within 6 months of completion of treatment} = \frac{\text{No of patients who develop new caries within 6 months of completion of treatment x 100\%}}{\text{No of patients diagnosed with ECC / S-ECC in that centre and treated in that centre (i.e., not to include patients referred to specialist)}} \times 100$$

* new caries: caries on a new surface of a tooth or caries in a tooth which was not previously carious

completion of treatment: caries arrested and all conservative treatment provided

7. REFERENCES

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APPENDIX I

Caries-risk Assessment for 0 – 3 Year Olds

(For Physicians and other Non-Dental Healthcare Providers)

Factors	*High Risk*	*Moderate Risk*	*Protective*
Biological			
Mother/ Primary caregiver has active caries	*Yes*		
Parents/ Caregiver has low socio-economic status	*Yes*		
Child has >3 between meal sugar-containing snacks / beverages per day	*Yes*		
Child is put to bed with a nursing bottle			
Child has special health care needs	*Yes*		
		Yes	
Protective			
Child receives optimally-fluoridated drinking water			*Yes*
Child has teeth brushed daily with a fluoridated toothpaste			*Yes*
Child receives topical fluoride from health professional			*Yes*
Child has regular dental care			*Yes*
Clinical Findings			
Child has white spot lesions or enamel defects	*Yes*		
Child has visible cavities or fillings	*Yes*		
Child has plaque on teeth		*Yes*	

Circling those conditions that apply to a specific patient helps the health care worker and parents understand the factors that contribute to or protect from caries. Risk assessment categorization of low, moderate, or high is based on preponderance of factors for the individual. However, clinical judgment may justify the use of one factor (eg, frequent exposure to sugar containing snacks or beverages, visible cavities) in determining overall risk.

Overall assessment of the child's dental caries risk: High □ Moderate □ Low □

Adapted from the American Academy of Pediatric Dentistry: Guideline on Caries-risk Assessment and Management for Infants, Children, and Adolescents, 2010

APPENDIX II

Caries-risk Assessment for 0 – 5 Year Olds

(For Dental Healthcare Providers)

Factors	*High Risk*	*Moderate Risk*	*Protective*
• *Biological*			
Mother/ Primary caregiver has active caries	*Yes*		
Parents/ Caregiver has low socio-economic status	*Yes*		
Child has >3 between meal sugar-containing snacks / beverages per day	*Yes*		
Child is put to bed with a bottle containing mil or added sugar	*Yes*		
Child has special health care needs		*Yes*	
• *Protective*			
Child receives optimally-fluoridated drinking water / fluoride supplements			*Yes*
Child has teeth brushed daily with a fluoridated toothpaste			*Yes*
Child receives topical fluoride from health professional			*Yes*
Child has regular dental care			*Yes*
• *Clinical Findings*			
Child has >1 decayed / missing / filled surfaces (dmfs)	*Yes*		
Child has active white spot lesions or enamel defects	*Yes*		
*Child has elevated mutans streptococci levels**	*Yes*		
Child has plaque on teeth		*Yes*	

Circling those conditions that apply to a specific patient helps the health care worker and parent understand the factors that contribute to or protect from caries. Risk assessment categorization of low, moderate, or high is based on preponderance of factors for the individual. However, clinical judgment may justify the use of one factor (eg, frequent exposure to sugar containing snacks or beverages, more that one dmfs) in determining overall risk.

** use where possible*

Overall assessment of the child's dental caries risk: High ☐ Moderate ☐ Low ☐

Adapted from the American Academy of Pediatric Dentistry: Guideline on Caries-risk Assessment and Management for Infants, Children, and Adolescents, 2010

APPENDIX III

Recommended Caries Management Protocol for 1-2 Year Olds

Risk Category	Diagnostics	Interventions		Restorative
		Fluoride	Diet	
Low Risk	Recall 6-12 months	- Twice daily brushing with 1000-1500ppm fluoridated toothpaste	Counseling	- Periodic monitoring for signs of caries progression
Moderate Risk	Recall 6 months	- Twice daily brushing with 1000-1500ppm fluoridated toothpaste - Professional topical Fluoride treatment 6 monthly	Counseling	- Careful monitoring of caries progression of incipient lesions - Prevention programme
High Risk	Recall 3 months	- Twice daily brushing with 1000-1500ppm fluoridated toothpaste - Professional topical Fluoride treatment 3 monthly	Counseling	- Careful monitoring of caries progression incipient lesions - Temporization of cavitated lesions / definitive treatment

Adapted from American Academy of Pediatric Dentistry. Guideline on Caries-risk Assessment and Management for Infants, Children and Adolescents, 2010.

APPENDIX IV

Recommended Caries Management Protocol for 3 - 5 Year Olds

Risk Category	Diagnostics	Interventions		Restorative
		Fluoride	Diet	
Low Risk	- Recall 6-12 Months - Radiographs every 12-24 months	Twice daily brushing with 1000-1500ppm fluoridated toothpaste	Counseling	- Periodic monitoring for signs of caries progression
Moderate Risk	- Recall 6 Months - Radiographs every 6-12 months	- Twice daily brushing with 1000-1500ppm fluoridated Toothpaste - Professional topical Fluoride treatment 6 monthly	Counseling	- Careful monitoring of caries progression of incipient lesions - Restore cavitated or enlarging lesions
High Risk	- Recall 3 Months - Radiographs every 6 months	- Twice daily brushing with 1000-1500ppm fluoridated toothpaste (with caution) - Professional topical Fluoride treatment 3 monthly	Counseling	- Careful monitoring of caries progression of incipient lesions - Restore cavitated or enlarging lesions

Adapted from American Academy of Pediatric Dentistry. Guideline on Caries-risk Assessment and Management for Infants, Children and Adolescents, 2010.

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