

# CLINICAL PRACTICE GUIDELINES

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## MANAGEMENT OF SEVERE EARLY CHILDHOOD CARIES



MINISTRY OF HEALTH MALAYSIA

## Statement of Intent

This clinical practice guideline is 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 health care 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

This guideline was issued in July 2005 and will be reviewed in 2008 or sooner if new evidence becomes available.

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## **ACKNOWLEDGEMENTS**

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- Dr. S. Sivalal, Deputy Director, Medical Development Division, Ministry of Health Malaysia
- CPG Secretariat, Medical Development Division, Ministry of Health Malaysia
- and all those who had provided valuable input and feedback

## **GUIDELINE DEVELOPMENT AND OBJECTIVES**

### **RATIONALE FOR GUIDELINE DEVELOPMENT**

Dental caries is still the most common oral health problem that can affect deciduous and permanent teeth. In children, it poses a challenging management problem for dental professionals especially if the lesion progresses with rapid onset. In Malaysia, the prevalence of dental caries in children below the age of five years is 87.1% (Ministry of Health Malaysia, 1995) which is far from the WHO oral health goal of 50% caries free in this age group.

Parents usually request the easiest and fastest way of overcoming pain and discomfort which leaves dental professionals with a dilemma of whether to remove the affected tooth to ease pain immediately or to restore the tooth to enable the child to eat and drink without further pain and at the same time maintaining good dentition. The approach adopted usually depends on the clinical judgment and experience of the operator and will vary with individuals and patients.

### **OBJECTIVES OF THE GUIDELINE**

The objective of this guideline is to provide the recommended management approaches as well as to create awareness among health personnel on the management of severe early childhood caries.

### **CLINICAL QUESTIONS**

The clinical questions for this guideline are:

- How to prevent childhood caries among preschool children?
- How should severe early childhood caries be managed?

### **TARGET POPULATION**

This guideline is applicable to toddlers and pre-school children with severe early childhood caries.

### **TARGET GROUP**

These guidelines are developed for the use of all health care personnel involved in managing severe early childhood caries.

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## **METHODOLOGY**

Literature search for this CPG was made mainly through Medline from 1988 to 2005. Assessment of abstracts and papers retrieved was conducted independently by the members of the CPG development group and any disagreements were resolved by discussion as a group. In each area considered, the best evidence available was given importance and synthesised before using it as a basis for recommendations

## **EVALUATION OF GUIDELINE**

This draft guideline was also posted on the Ministry of Health Malaysia website for views, feedback and suggestions for improvement of the guideline.

## TABLE OF CONTENTS

<i>Acknowledgements</i>	<i>i</i>
<i>Guideline Development and Objectives</i>	<i>ii</i>
<i>Members of the Panel</i>	<i>iii</i>
<i>Methodology</i>	<i>iv</i>
<i>Evaluation of Guidelines</i>	<i>iv</i>
<i>Table of Contents</i>	<i>v</i>
<i>Glossary</i>	<i>vi</i>
1. Introduction	1
2. Definition	1
3. Diagnosis	1
4. Management	2
4.1 Non-acute S-ECC	2
4.1.1 Conservative management	2
4.1.2 Preventive treatment	2
4.1.3 Restorative treatment	2
4.2 Acute S-ECC	3
4.2.1 Immediate treatment	3
4.2.2 Stabilisation	3
4.2.3 Definitive treatment	4
4.2.4 Follow-up	5
5. Preventive Strategy	5
6. References	6
Algorithm	10
<i>Appendix 1</i>	11
<i>Appendix 2</i>	12
<i>Levels of Evidence Scales</i>	13

## GLOSSARY

### **Dental caries**

The dissolution of the calcified tissue of the tooth (enamel and dentine) by acids produced from the fermentation of carbohydrates (sugar) by bacteria present on the tooth surface in plaque. The progression of dental caries is influenced by quality and quantity of saliva, exposure of the tooth to fluoride and other trace elements.

### **Severe early childhood caries**

Term used to describe a severe form of caries often affecting young children involving the deciduous upper maxillary tooth surfaces most severely, and the upper and lower deciduous molars to various degrees of severity. The lesions usually appear suddenly, are widespread and rapidly involve the tooth pulp.

### **Active caries**

The carious lesion which is characterized by enamel demineralization (white lesion) and yellow coloured dentine, which is soft to probing.

### **Arrested caries**

The carious lesion that is no longer progressive. Enamel demineralization (white lesion) is absent and dentine is dark brown to black in colour, and it is hard to probing.

### **Stabilization**

The process of instituting preventive and interventive procedures to control the progression of active caries in the oral cavity. It involves instruction in oral hygiene procedures, diet counselling, fluoride therapy and placement of intermediate restorations such as glass-ionomer cement.

## 1. INTRODUCTION

Dental caries is one of the most common diseases affecting mankind. Almost every individual is susceptible to dental caries. However, caries is more prevalent in the younger population and considered a disease of childhood.

The term severe early childhood caries (S-ECC) is used where dental caries affects many deciduous teeth especially the upper incisors in the preschool child. Previously the terms rampant caries, nursing caries, and baby bottle caries were used to describe this debilitating condition. While there is evidence that children with S-ECC have frequent exposure to sweetened drinks and milk, it has also been shown that the likelihood of development of S-ECC is not uniform for all infants and toddlers frequently exposed to cariogenic fluids (NIH Consensus Statement, 2001<sup>Level 9</sup>; Amid, 1999<sup>Level 1</sup>). S-ECC is mostly preventable. When it does occur, it needs comprehensive, and sometimes, complex care.

S-ECC is a major component of cases referred to paediatric dental specialist clinics. Many children with S-ECC are also medically compromised and this poses an additional risk to their well-being. Often S-ECC in the pre-school child is left untreated or treated on an as and when the need arises basis. As a result, many of these children have extractions at a very early age (Curzon, 1994<sup>Level 5</sup>).

## 2. DEFINITION

Severe-early childhood caries describes dental caries in the primary dentition of young children that occur abruptly, spread widely and rapidly, and is burrowing in nature resulting in early involvement of the dental pulp.

## 3. DIAGNOSIS

The current methods for diagnosing substantial or cavitated dental caries though sensitive and specific, are not effective in diagnosing non-cavitated caries, root surface caries or secondary caries (NIH Consensus Statement, 2001<sup>Level 1</sup>). Visual inspection with the aid of plane mouth mirrors is most useful for diagnosing carious lesions. In addition, the posterior bitewing radiographs are an essential adjunct (Kidd & Pitts, 1990<sup>Level 9</sup>).

### S-ECC from various views



Oral view



Upper jaw view



Lower jaw view

## 4. MANAGEMENT

### 4.1 Non-acute S-ECC

#### 4.1.1 Conservative treatment

In non-acute S-ECC, the child may be symptomless and the carious lesion may be arrested. In such cases, no therapy is required. However, the caries should be monitored to ascertain that it remains in the non-progressive stage until exfoliation (Levine, 2002<sup>Level 6</sup>).

#### 4.1.2 Preventive treatment

Prevention of S-ECC requires a multifactorial approach. The strategies for re-mineralisation are crucial and should be reinforced from time to time. These include the following:

- Diet counselling (Al-Malik, 2001<sup>Level 8</sup>; Shantinath, 1996<sup>Level 7</sup>; Eronat & Eden, 1992<sup>Level 7</sup>)
- Topical fluoride application (Schwartz, 1998<sup>Level 2</sup>; Stookey, 1993<sup>Level 1</sup>)
- Professional application of fluoride varnishes (Autio-Gold, 2001<sup>Level 2</sup>; Weinstein, 1994<sup>Level 4</sup>; Peyron, 1992<sup>Level 6</sup>)
- Sugar free chewing gum (Autio, 2002<sup>Level 3</sup>; Makinen, 1995<sup>Level 2</sup>; Makinen, 1996<sup>Level 3</sup>; Birkhed, 1994<sup>Level 9</sup>; Kandelman, 1990<sup>Level 3</sup>)
- Health education on oral health

#### 4.1.3 Restorative treatment

The principal role of restorative treatment is to eliminate cavitations, that make plaque removal difficult, and thus promote caries extension. Restorative treatment should always be used in conjunction with preventive therapy, based on the child's risk factors and age (Al-Malik, 2001<sup>Level 8</sup>).

The choices of restorative materials are influenced by the following:

- site and extent of caries
- child's ability to cooperate (Kilpatrick, 1993<sup>Level 9</sup>)
- duration for which the restoration is required to last
- type of analgesia used in providing treatment

Initial caries control and stabilisation can be achieved by using the following:

- glass ionomer cement
- silver cement or
- zinc oxide eugenol cements

(Harris & Coley-smith, 1998<sup>Level 8</sup>; Kandelman, 1990<sup>Level 3</sup>).

The commonly used materials to restore primary teeth are as follows:

- dental amalgam
- resin based composites
- glass ionomer cements
- stainless steel/nickel chrome extra-coronal crown

(Harris & Coley-Smith, 1998<sup>Level 8</sup>; Walker, 1996<sup>Level 8</sup>; Johnston, 1994<sup>Level 9</sup>; Gray & Paterson, 1994<sup>Level 2</sup>; Kilpatrick, 1993<sup>Level 9</sup>; Ripa, 1988<sup>Level 9</sup>).

More extensive procedures and techniques as well as the use of sensitive materials is possible with general anaesthesia, as maximum cooperation and moisture control can be achieved. In young children with high risk of caries, stainless steel crowns have been shown to function better than multi-surface intra-oral restorations (Tinanoff & Douglass, 2001<sup>Level 9</sup>).

The choice of materials for restorative treatment is as in Appendix 1.

## **4.2 Acute S-ECC**

### **4.2.1 Immediate treatment**

- Children with acute S-ECC often present with pain, discomfort and infection, and may require medication (as in Appendix 2). Severe cases may require hospitalization prior to definitive treatment.
- Systemic infection resulting from a local focus of dental infection, should be treated with antibiotics (refer Appendix 2)

### **4.2.2 Stabilization of dentition**

Caries progresses rapidly through the thin dentine of primary and young permanent teeth and may rapidly endanger the pulp (Levine, 2002<sup>Level 6</sup>; Kidd & Pitts, 1990<sup>Level 9</sup>).

In providing initial treatment, the following need to be considered:

- identification and extraction without delay of teeth that are unrestorable, or are not to be preserved for other reasons
- temporization prior to definitive treatment of teeth that are to be preserved

(Amid, 1999<sup>Level 1</sup>; Ministry of Health Malaysia, 1995<sup>Level 9</sup>; Curzon, 1994<sup>Level 5</sup>; Kidd & Pitts, 1990<sup>Level 9</sup>).

### 4.2.3 Definitive treatment

Extraction of primary teeth is one of the treatment options in managing children with S-ECC (Alsheneifi & Hughes, 2001<sup>Level 8</sup>; Tickle, 2002<sup>Level 8</sup>; Holt, 1992<sup>Level 8</sup>; Vinckier, 2001<sup>Level 8</sup>, Jamjoom 2001<sup>Level 8</sup>). The decision to extract should only be made after considering both general and local factors below.

#### **General factors**

- patient's cooperation (Harris & Coley-Smith, 1998<sup>Level 8</sup>)
- medical condition (Harris & Coley-Smith, 1998<sup>Level 8</sup>)
- dental infection - may increase patient's morbidity (Harris & Coley-Smith, 1998<sup>Level 8</sup>)
- immunocompromised condition (Fayle, 1992<sup>Level 9</sup>)
- bleeding disorder(Harris & Coley-Smith, 1998<sup>Level 8</sup>)

#### **Local factors**

- restorability (Fayle, 2001<sup>Level 9</sup>)
- extent of caries which may involve the pulp and roots
- potential for malocclusion or disturbances in development of the dentition - balancing and compensating extraction may be considered (Rock, 2002<sup>Level 9</sup>)

#### **Use of general anaesthesia**

General anaesthesia should be considered in every child, especially where several teeth have to be extracted whilst others need complicated restorative treatment, as it is less stressful.

Indications for general anaesthesia include the following:

- children with learning disabilities to the degree that the dentist cannot communicate effectively (Hulland & Sigal, 2000<sup>Level 8</sup>; Holt, 1991<sup>Level 7</sup>; Vermeulen, 1991<sup>Level 8</sup>)
- children with severe dental anxiety or the very young child with whom adequate cooperation cannot be achieved by the usual behavioral guidance procedures, supplemented by pre-medication, analgesia and/or acceptable degree of physical restraint (Alcaino, 2000<sup>Level 6</sup>; Jamjoom, 2001<sup>Level 8</sup>; Vinckier, 2001<sup>Level 8</sup>; Harrison & Roberts, 1998<sup>Level 4</sup>; Holt, 1992<sup>Level 8</sup>)
- children with systemic disturbances and congenital anomalies that require general anaesthesia (Mortada, 2002<sup>Level 8</sup>; Jamjoom, 2001<sup>Level 8</sup>; Fayle, 2001<sup>Level 9</sup>; Ibricevic, 2001<sup>Level 8</sup>; Spivac, 2001<sup>Level 9</sup>; Roberts, 1990<sup>Level 9</sup>; Holt, 1992<sup>Level 8</sup>)

#### 4.2.4 Follow-up

- children with S-ECC must be reviewed to detect any changes
- children with obvious signs of active oral disease or its predisposing factors should be reviewed at 4-monthly intervals until well controlled
- compromised children should be reviewed depending on the severity of their underlying impairment and oral findings
- reinforcement of appropriate preventive strategies for remineralisation and arrest of carious lesions should be carried out
- review should be carried out by the same clinician, where possible (Cameron and Widmer, 1997<sup>Level 9</sup>)

## 5. PREVENTIVE STRATEGIES

Oral hygiene measures should be implemented by the time of eruption of the first primary tooth to prevent dental caries in children (Council on Clinical Affairs, 2005<sup>Level 9</sup>)

- Wean from bottle at 12 to 14 months of age (Council on Clinical Affairs, 2005<sup>Level 9</sup>)
- Avoid putting infants to sleep with a bottle
- Avoid nocturnal breastfeeding after the first primary tooth begins to erupt
- Encourage parents to teach their infants to drink from a cup as they approach their first birthday (Council on Clinical Affairs, 2005<sup>Level 9</sup>) and avoid consumption of juices from the bottle
- Advise parents and children on
  - regular brushing of teeth, as soon as children have teeth, after breakfast and before bedtime, using pea-sized children's tooth brush and toothpaste with fluoride
  - decreasing quantity and frequency of sugar intake
  - avoiding sweet snacks between meals and immediately before bedtime
  - avoiding frequent consumption of liquids containing fermentable carbohydrates (Council on Clinical Affairs, 2005<sup>Level 9</sup>)
- Encourage substitution of sugar-free liquid medicines wherever appropriate

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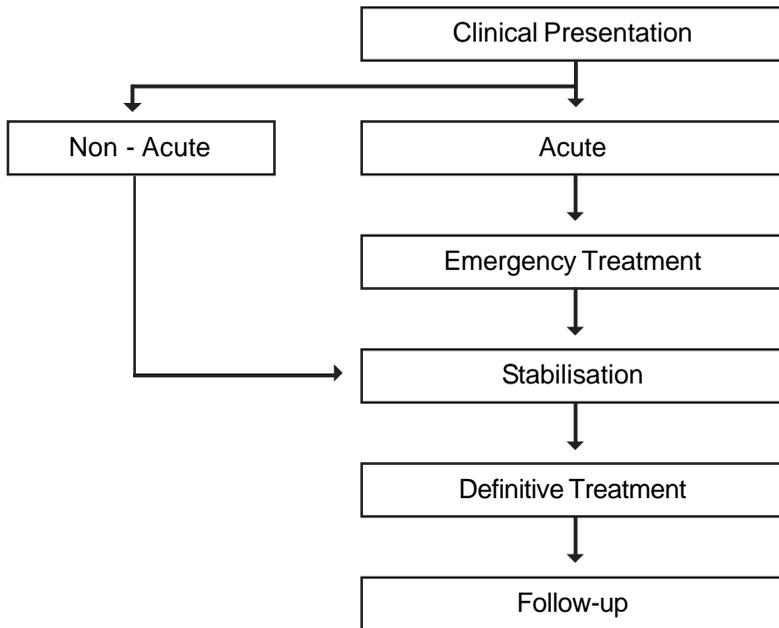
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## ALGORITHM OF MANAGEMENT OF SEVERE EARLY CHILDHOOD CARIES



## CHOICE OF MATERIALS FOR RESTORATIVE TREATMENT

Caries type	Stages	
	Initial caries	Caries into dentine or more extensive caries
<b>Occlusal caries</b>	<ul style="list-style-type: none"> <li>▪ preventive resin restoration (Walker, 1996<sup>Level 8</sup>; Welbury, 1990<sup>Level 2</sup>)</li> <li>▪ with good isolation, composites give better retention than glass ionomers (Gray &amp; Paterson, 1994<sup>Level 2</sup>; SIGN, 2000<sup>Level 9</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>▪ caries into dentine should be removed and restored, rather than fissure sealant placed over the caries (SIGN, 2000<sup>Level 9</sup>; Swift, 1988<sup>Level 9</sup>);</li> <li>▪ cavities can be restored with amalgam, composites, compomers or glass ionomer (Walker, 1996<sup>Level 8</sup>; Gray &amp; Paterson, 1994<sup>Level 2</sup>; Corbin &amp; Kohn, 1994<sup>Level 1</sup>; Kilpatrick, 1993<sup>Level 9</sup>)</li> <li>▪ more extensive caries could be restored using amalgam. concerns on mercury related hazards have not been substantiated (Corbin &amp; Kohn, 1994<sup>Level 1</sup>)</li> <li>▪ stainless steel crowns have a very high success rate and are useful to restore deciduous molars with extensive caries (Ripa, 1988<sup>Level 9</sup>; Harris &amp; Coley-Smith, 1998<sup>Level 8</sup>; Johnston, 1994<sup>Level 9</sup>)</li> </ul>
<b>Approximal caries</b>	<ul style="list-style-type: none"> <li>▪ application of fluoride varnish can slow or arrest progression of approximal enamel lesions (SIGN, 2000<sup>Level 9</sup>)</li> <li>▪ operative intervention is not indicated at this stage of development (SIGN, 2000<sup>Level 9</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>▪ composite resin is suitable for restoring small to moderate sized class II cavities (SIGN, 2000<sup>Level 9</sup>)</li> <li>▪ amalgams and stainless steel crowns could be used in more extensive lesions (SIGN, 2000<sup>Level 9</sup>)</li> </ul>
<b>Smooth surface caries</b>	<ul style="list-style-type: none"> <li>▪ preventive care is recommended rather than operative procedure (SIGN, 2000<sup>Level 9</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>▪ adhesive restorative materials are preferable as cavities tend to be wide and shallow (SIGN, 2000<sup>Level 9</sup>)</li> </ul>

**ANALGESICS FOR IMMEDIATE TREATMENT  
FOR CHILDREN 1 YEAR AND OLDER**

<b>Analgesics</b>	<b>Dosage</b>	<b>Frequency</b>	<b>Route of administration</b>
Paracetamol	15 mg/kg/dose	4-6 hourly (max 4g/day)	Oral
Ibuprofen	5-10 mg/kg/dose	6-8 hourly	Oral
Diclofenac	1 mg/kg/dose	8-12 hourly	Oral
Naproxen*	5-10 mg/kg/dose	8-12 hourly	Oral

*Note: For short term use, maximum 3 days*

*\* For children > 2 years old*

**ANTIBIOTICS FOR SYSTEMIC INFECTION**

<b>Antibiotics</b>	<b>Dosage</b>	<b>Frequency</b>	<b>Route of administration</b>
Amoxicillin*	10-25 mg/kg/dose	8 hourly	Oral
Penicillin V*	7.5-15 mg/kg/dose	6 hourly	Oral
Erythromycin	10 mg/kg/dose	6 hourly	Oral
Metronidazole	7.5 mg/kg/dose	8 hourly	Oral

*Note: \* Drugs of choice*

## LEVELS OF EVIDENCE SCALE

The definitions of the types of evidence used in this guideline are adapted from the Catalonian Agency for Health Technology Assessment.

<b>Level</b>	<b>Strength of Evidence</b>	<b>Study Design</b>
<b>1</b>	Good	Meta-analysis of RCT, Systematic review
<b>2</b>	Good	Large sample RCT
<b>3</b>	Good to Fair	Small sample RCT
<b>4</b>	Good to Fair	Non-randomised controlled prospective trial
<b>5</b>	Fair	Non-randomised controlled prospective trial with historical control
<b>6</b>	Fair	Cohort studies
<b>7</b>	Fair	Case-control studies
<b>8</b>	Poor	Non-controlled clinical series, descriptive studies multi-centre
<b>9</b>	Poor	Expert committees, consensus, case reports anecdotes