

## Early Childhood Caries:-A Review

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### Abstract

Beltrami characterized this pattern of early caries in young children in 1930s as “black teeth”. One of the most prevalent diseases in children worldwide Early childhood caries(ECC).Ecc can be arrested and probably even reversed in its early stages, it is often not self-limiting and progresses without proper care until the tooth is decayed. It is often complicated inappropriate feeding habits and heavy infection with mutans streptococci. A professional preventive program that includes oral hygiene instructions for mothers or caregivers, along with fluoride and diet counseling should be targeted for such children. In Ecc their high risk for develop caries with the permanent dentition or will have other problems with speaking and/or eating.

**Keywords:** Children, Deciduous teeth, Early childhood caries

### Introduction

Defined as occurrence of any signs of dental caries on the tooth surface during first 3years of life, another terminologies of ECC are Nursing caries: winter(1996),Tooth clearing neglect: Moss(1996),ECC: Davies(1998). Most prevalent diseases in children world-wide are ECC. It does not only affect children’s oral health, but also the general

health of children. Not only oral pain, orthodontic problems, and enamel defects, but also problems with eating and speaking can occur as well as an increased risk for caries development in the permanent dentition. Orthodontic problems in adult life due to premature loss of primary dentition Developmental Stages of Early Childhood Caries: -

Stage	Clinical Stage	Age	Features
Stage I	Initial reversible stage	10-18 months	Chalky white demineralization areas at civically and interproximally
Stage II	Damage carious stage	18-24 months	Lesion in maxillary anterior teeth, may spread to dentin and yellowish-brown discoloration
Stage III	Deep lesion	24-36 months	Molars are also affected Pulpal involvement in maxillary incisors
Stage IV	Traumatic Stage	36-48 months	Molars are now associated with pulpal problems Maxillary incisors become no vital

### Aetiology of ECC: -

Dental caries develops when the dental plaque, a polymicrobial biofilm, is not removed regularly and the diet consists of mainly monosaccharides. Monosaccharide’s can be metabolized by many of the oral bacteria leading to an increased production of acids which are able to demineralise the enamel. Dental plaque is built on top of the pellicle starting directly after mechanical removal of the bio film. The dental plaque on clinically sound enamel of children consists mainly of streptococci and actinomycetes. With a low-sugar diet, these microorganisms are

living as commensalism in a homeostatic environment controlling each other. As soon as sugars, especially sugary food and beverages, are consumed, the commensally plaque micro biota will absorb these saccharine and metabolize them into acids, mainly lactic acid. This acid production leads to a pH shift from around 7 (neutral) to a pH<5.5 (acidic) Acid-tolerant bacteria, mainly mutans streptococci. Infects feeding a pattern that is bedtime bottle use in children with and without maxillary anterior decay. Length of contact with the bottle at night time is also important, greater length of bottle

contact appears to be positively associated with caries. Although commonly believed to be the cause of maxillary anterior caries. Saliva also contains several organic compounds which agglutinate oral bacteria and enhance their removal. Flow rates of saliva are important as oral clearance buffering capacity and antimicrobial activities.

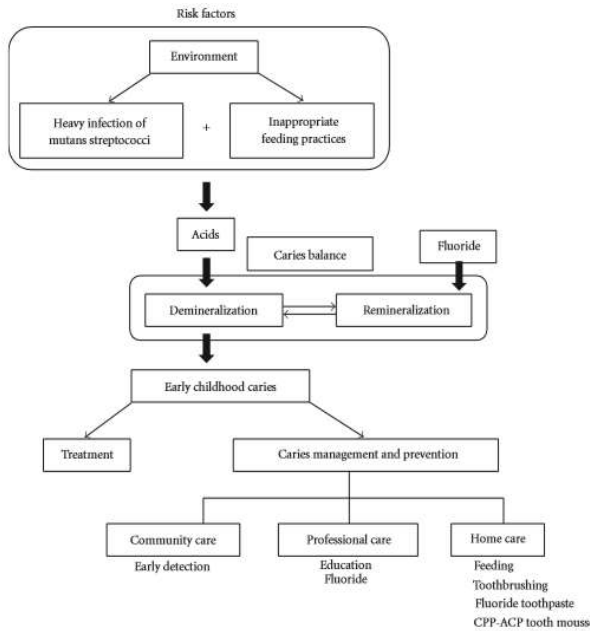


FIGURE 1: Brief overview of early childhood caries.

**Characteristics of Deciduous Enamel and Enamel of Permanent Teeth**

The hardest tissue in the human body is Enamel. It mainly consists of hydroxyapatite (97%) (HAP), Ca5 (PO4)3(OH), which is a calcium phosphate mineral. Odontoblasts produced by interior of a tooth consists of dentin (about 70% HAP and 20% proteins mainly collagen and 10% water), and the enamel, that is built by ameloblasts. Ameloblasts produce several proteins and attract calcium and phosphate ions to crystallize these are restricted to produce enamel one time. The enamel of deciduous teeth is built within a significantly shorter period (24 months) than permanent teeth (up to 16 years). The significance of the shorter time for enamel development is the formation of a very thin enamel (half the thickness than that of the permanent teeth) and a less organized microstructure. As consequence, acids are able to demineralise deciduous enamel rapid than permanent enamel.

**Risk Factors**

ECC is known to be a multifactorial disease. Sugary food and beverages can lead to a dysbiotic state of

the microbial composition causing caries. As ECC is also known as “baby bottle caries,” feeding practices are noticed as main risk factor developing ECC. It affect the upper incisors and molars at first, followed by the molars of the lower jaw and finally the lower jaw incisors. At high risk for developing ECC in children sleeping with bottles filled with sweetened tea or milk containing several cariogenic sugars .Oral bacteria will produce lactic acid rapidly lead to the enamel dematerializing as a consequence of drinking during night time, without clearance of sugars. Today, not only baby bottles, but also several other sweetened juices consumed throughout the day or even at night will enhance the risk to develop caries. ECC is a disease ejecting both low-SES families and high-SES families. Other important factors that increase the risk to develop ECC are irregular tooth brushing (mechanical plaque removal) and/or tooth brushing without supervision by any caregivers. Therefore, oversee thorough tooth brushing twice a day should be applied. In Ecc environmental risk factors play important role as a systematic review concluded that children were most likely to develop caries if MS was acquired at an early age, although this may be partly compensated for by other factors, such as good oral hygiene and a noncariogenic diet. Economic environment in which children live development of oral hygiene habits may be sensitive. Such environmental factors include caregivers’ social status poverty, ethnicity, deprivation, number of years of education, and dental insurance coverage. Despite the wide spread decline in caries prevalence and severity in permanent teeth in high-income countries over recent decades, discrepancy remain, and many children still develop dental caries.

**Clinical Presentation of ECC according to Stages:**



**Treatment**

Children’s cooperative level is low so determining the causes of dental caries in children, providing

education on oral health matters to their parents and controlling demineralization are especially main. Treatment includes of restoration or the surgical removal of decayed teeth. Relapse rates of approximately 40% within the first year after dental surgery have been reported. Thus, many countries have move towards a largely preventative and preservative approach rather than surgical treatment in dental caries management. Prevention and preservation of tooth tissue are desirable because the

normal treatment for cavity because we all know that cavity progresses slowly in most of the people, prevention is effective, and excessive and premature surgery can cause harm. When restorative intervention is required, modern micro restorative techniques that use new adhesive materials also can preserve tooth structure.

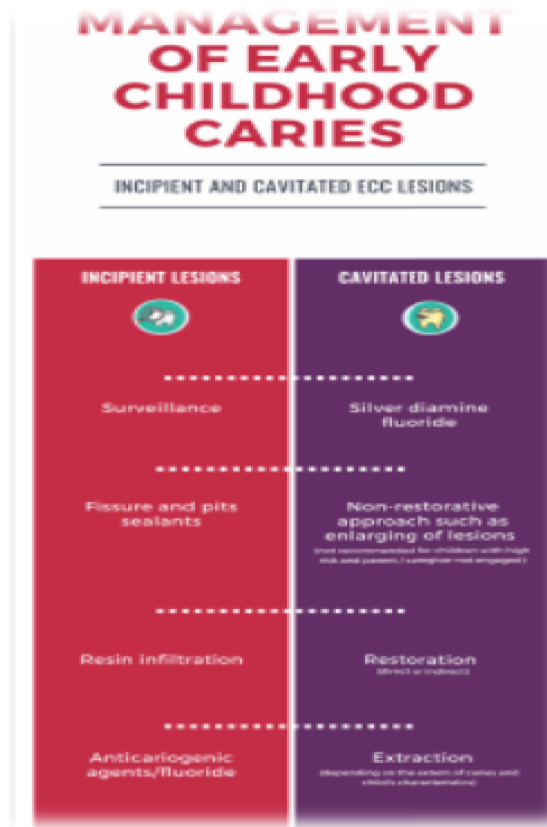
**Characteristics of selected studies and recommended procedures for ECC management: -**

Author, year	Country	Recommended procedures management
Asociación Argentina de Odontología para Niños [19]	Argentina	Remineralisation with fluorides: systemic fluoride, topical fluoride-including fluoride toothpaste [6 months to 2 years: do not use; < 500 ppm for young children; 1000–1450 for children> 6 years]). Management of cavitated lesions: atraumatic restorative treatment, restoration with glass ionomer cement, composite resins and amalgam, steel crowns on primary molars
Kandiah et al., 2010 (replace Rayner et al., 2003 [20]; Fayle et al., 2001 [21]) [22]	British Society of Paediatric Dentistry (United Kingdom)	Management of active dental caries requires a combination of: - Prevention: water fluoridation, use of fluoride toothpaste and professional topical fluoride application, diet counselling, and provision of fissure sealants; -Restoration: use of stainless-steel crowns, and plastic restorations on small one and two surface cavities; - Pulp management, if necessary; -extraction. * Inhalation sedation and general anesthesia (GA) should be available for anxious children. GA can be used in cases of extensive disease
American Academy of Pediatric Dentistry, 2016 [23] (replace AAPD, 2008 [24])	American Academy of Pediatric Dentistry (United States)	Anticariogenic agents (fluoride toothpaste and fluoride varnish) Definitive restorative Interim therapeutic restorations (ITR) or silver diamine fluoride (young children) Stainless steel crowns (advanced cases) *The selection of treatment is determined by the extend of the disease process, the patient’s developmental level and the comprehension skills. *More emphasis on prevention and arrestment to minimize the necessity of use of sedation and general anesthesia.
American Academy of Pediatric Dentistry, 2017 [27]	American Academy of Pediatric Dentistry (United States)	Use of 38% SDF for the arrest of cavitated caries lesion
Peariasamy et al., 2012 [40]	Malaysia	Non-cavitated proximal enamel lesions: resin infiltration system used in conjunction with fluoride. Teeth that require temporization: use of spoon excavators followed by sealing the teeth with glass ionomer cement. Restorative treatment with amalgam, composite, glass ionomer cement, resin modified glass ionomer, high-viscosity glass ionomer, polyacid modified composite resin, stainless steel crown. Teeth pulpally involved: extraction or endodontic treatment, based on patient’s cooperation, medical condition, infection, restorability, extent of caries, potential for malocclusion. * The use of general anaesthesia may be considered for uncooperative children or children that require extensive treatment.

Evaluate all the documents, most of the studies were published in English between 2011 and 2018.

Documents were identified from the United States, United Kingdom, Malaysia, Brazil, Chile, Argentina,

the British Society of Paediatric Dentistry and the European Academy of Paediatric Dentistry.



Different procedures were suggested for the management of ECC lesions, starting from surveillance to extraction above figure. Active surveillance – careful monitoring of lesions progression and application of prevention measures - was recommended for incipient lesions, apart from children older than 3years with high caries risk and whose parents weren't engaged. For incipient lesions, other options were fissure and pit sealants, resin infiltration for proximal enamel lesions the utilization of anti-cariogenic agents and fluoride. For the arrest of cavitated caries lesions, the utilization of 38% silver diamine fluoride (SDF) was recommended especially for young children, only for American Academy and just after 2016. most documents advocated the restoration of primary teeth with cavitated carious lesion. Interim therapeutic restorations (ITR) could also be indicated for caries control in children with an excellent deal of cavitated carious lesion, also as for the uncooperative patient, young children and patients with special health care needs that would not receive permanent restorations.

to revive primary teeth, it had been recommended the utilization of various materials/techniques, like Atraumatic Restorative Treatment ART; restoration with glass ionomer cement or resin-based composites or amalgam; stainless steel crowns. The Hall Technique was first added at 2013 .The provision of prosthetic restoration, fixed or removable, was endorsed in children who lost teeth . Extraction was advisable, mainly for teeth pulpal involved depending on the patient's cooperation, medical condition, infection, the extent of caries and potential for malocclusion. No other differences apart from of that mentioned above (SDF and Hall Technique) were found among recommendations along time and in several places.

**:-Recommendations on Preventive Measures That Includes Either ECC or Infant Oral Health Care**

- Infant oral health begins ideally with prenatal oral health counselling for parents.
- An oral health consultation visit within six months of eruption of first tooth, and no later than 12 months of age, is recommended to educate parents on prevention of dental disease.
- Infants should not be put to sleep with a bottle. *Ad libitum* nocturnal breast-feeding should be avoided after the first primary tooth begins to erupt.
- Children should be weaned from the breast or the bottle by 12–14 months age.
- Parents should be advised to reduce their child's sugar consumption frequency.
- Consumption of juices from bottle should be avoided. When juices are offered, it should be from a cup.
- Oral hygiene measures should be implemented by the time of eruption of the first primary tooth.
- An attempt should be made to assess and decrease the mother/primary carer's *S. mutans* levels to decrease the transmission of cariogenic bacteria and lessen the child's risk of developing ECC.



**Figure 2 Post operative pictures showing anterior with strip crown and posterior with stainless steel crown**



**Figure 3: Post operative picture showing restoration**

This oversee review was performed recognize what procedures were recommended for the management of ECC lesions and assist study of the information available on the guidelines/guidance/policies. Active surveillance was proposed by few recommendations, and only for incipient lesions. However, considering that the surveillance may be a pivotal component of caries management, it should be recommended for all patients, getting to both arrest lesions and monitor the progression. For non-activated carious lesions, the utilization Characteristics of selected studies and recommended procedures for ECC management (Continued) Author, year Country and/or Association Recommended procedures management Peariasamy et al., 2012 [40] Malaysia Non-cavitated proximal enamel lesions: resin infiltration system utilized in conjunction with fluoride. Teeth that need temporary treatment: use of spoon excavators followed by sealing the teeth with glass ionomer cement. Restorative management with amalgam, composite, glass ionomer cement, resin modified glass ionomer, high-viscosity glass ionomer, polyacid modified composite resin, stainless-steel crown. Teeth pulpally complicated: extraction or endodontic treatment, supported patient's cooperation, medical condition, infection, restorability, extent of caries, potential for malocclusion. The utilization of general an aesthesia could also be considered for uncooperative children or children that need extensive treatment. Hardly from the document published in Argentina, were the suggested fluoride concentration and amount of toothpaste for each age described. However, the guidance is not out of date. This information has newly been discussed, and it is suggested that for all children a concentration of at least 1000 ppm fluoride should be used for twice-daily brushing, following the suggested amount of toothpaste for each age. For children under 3 years old, the amount of fluoridate toothpaste corresponding to smear size is suggested, while children under 3–6 years old should use the amount relative to pea-size. Two studies illustrated that keeping cavities in primary molars without

biofilm might be a treatment option to arrest cavitated lesions. The success of this therapy - keep cavitated lesions without placing restorative materials (non-restorative approach) - depends on the attitudes of patients and their families to brush the lesions and alternation in habits.

## Conclusion

In additionally to a low sugary diet, children should brush their teeth twice a day under parental management and be supported with brushing. The caregivers should mostly support very young children (under the age of 3) continuously. ECC to provide therapy or refer the patient to an appropriate trained individual for treatment. Immediate intervention is necessary to prevent further dental destruction as well as more wide spread health problems. Because children who experience ECC are at greater risk from subsequent caries development aggressive preventive and therapeutic measures, such as regimanted application of topical or full crown coverage are often necessary.

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