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Original Research

Early Childhood Caries

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ABSTRACT
Dental caries has a lasting detrimental impact on dentition. Early childhood caries is a serious problem in both developing as well as industrialized countries. It is characterized as early onset and rapid progression. Preventive measures help to reduce their spread but they are only effective when parents and caregivers follow the preventive measures as described. Management of decayed teeth requires professional treatment to remove infection and restore tooth function. This review article gives in-depth knowledge about various aspects of early childhood caries.

Keywords: Early childhood caries, rapid progression, preventive measures, management

INTRODUCTION
Caries is a biofilm-induced acid demineralization of enamel or dentin, mediated by saliva. According to **Shafers:** dental caries is an irreversible microbial disease of calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic portion of the tooth. The disease of early childhood caries (ECC) is defined as the presence of 1 or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger (**American Academy of Pediatrics Dentistry, 2016**).[1] In children with age less than 3 years, any sign of smooth-surface caries is indicative of severe early childhood caries. According to **Winter et al in 1960** "Nursing caries is a unique pattern of dental decay in young children due to

prolonged nursing habits". Children experience more dental caries between ages of 2-5 years who didn't visit the dentist past year. Early childhood caries (ECC) is a serious public health problem in both developing and industrialized countries[2]. ECC can begin early in life, progresses rapidly in those who are at high risk, and often goes untreated[3]. It is also known asnursing bottle caries, baby bottle tooth decay, night bottle mouth, and night bottle caries, baby bottle caries.

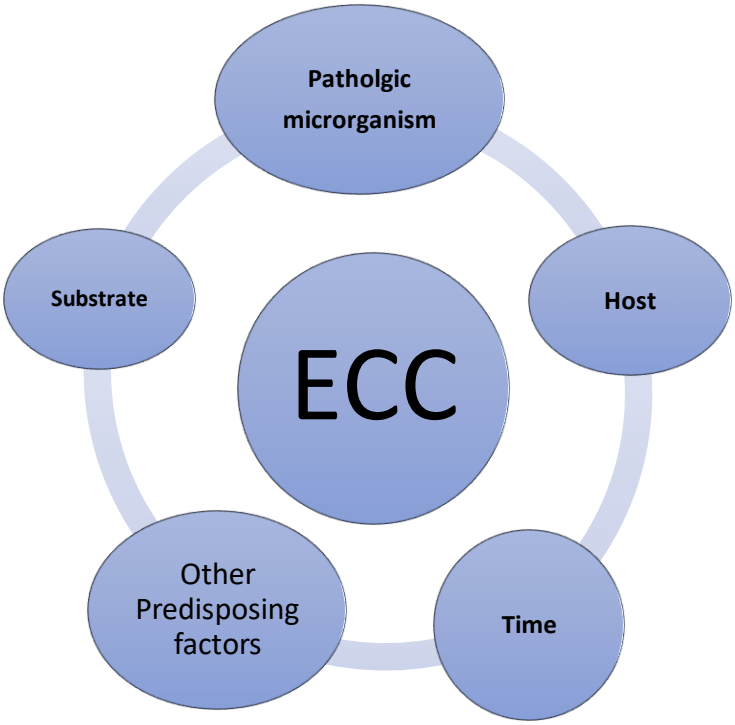
S.No	Name	Author's name	Year
1.	Nursing Caries	Winter Et Al	1968
2.	Nursing Bottle Mouth	Kroll Et Al	1967
3.	Nursing Bottle Syndrome	Shelton Et Al	1977
4.	Baby Bottle Caries	Diley Et Al	1980
5.	Nursing Bottle Caries	Tsamtsouris	1986
6.	Baby Bottle Tooth Decay	Mim Kelly Et Al	1987
7.	Early Childhood Caries	Davies	1998

The prevalence of ECC children in the general population of Canada is less than 5%; but in a high-risk population, 50–80% are affected.[4] Published studies show higher prevalence figures for 3-year-old, which ranges from 36 to 85%[5] in Far East Asia region, whereas this figure is 44% for 8 to 48-month-olds[6]reported in Indian studies. ECC is randomly dispersed in the population, with the disease affecting disproportionately deprived families.[7]Weinstein emphasizes the discrepancy in ECC prevalence rate: 1–12% in developed countries, whereas it is as high as 70% in developing countries or within select immigrant or ethnic minority populations.[8]

ECC is a multifactorial disease that results from the interaction of various factors such as microbiological, dietary, and environmental risk factors. It is mainly attributed to a time-specific interaction of microorganisms (mainly *Streptococcus mutans* (SM)) with sugars on a tooth surface.[9] The major source of acquiring the SM is from the mother during the first 1-2 years. Poor maternal oral hygiene maintenance and frequent snacking and sugar exposure increase the chances of transmission of the infection to the child.[10] SM isolates from infants indicated that the source of the SM in children is mainly from their mothers *via* vertical transmission through saliva. [11] Diet makes a significant impact on the condition of oral health of children such as children eating fewer fruits and vegetables have prominent chances of gaining caries very early in their lives. The small size of sugar molecules allows salivary amylase to split the molecules into components that can be easily metabolized by plaque bacteria.[12] This process leads to bacteria producing acidic end products with subsequent de-mineralization of teeth[13] and increased risk for caries on susceptible teeth. (American Academy of Pediatrics Dentistry, 2016.) Most of the children from low socio-economic backgrounds experience a more significant level of caries than others, those who belong to ethnic and racial minorities, who are born to single mothers, whose parents have low educational levels, especially those of illiterate mothers.[14]

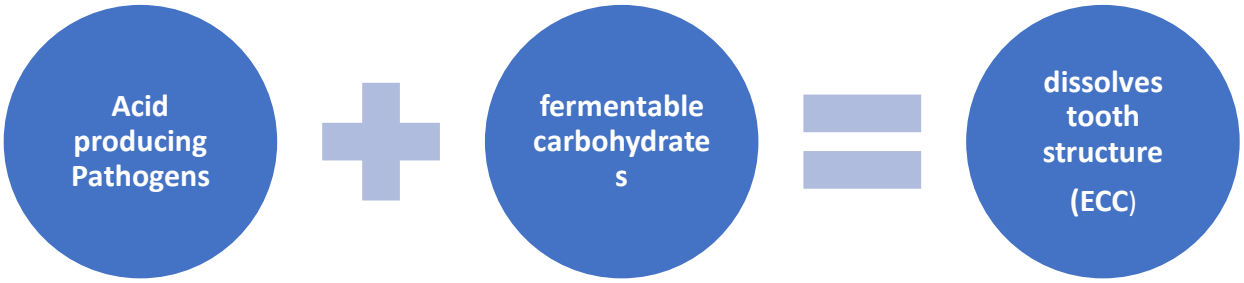
FEEDING PRACTICES

Most of the studies have shown a significant correlation between ECC and bottle-feeding and sleeping with a bottle. Frequent and more contact of enamel with human milk results in acidogenic conditions and softening of enamel. Increasing the time per day that fermentable carbohydrates are available is the most significant factor in shifting the re-mineralization equilibrium toward de-mineralization.[15] Milk-based formulas for infant feeding, even those without sucrose in their formulation, proved to be cariogenic.



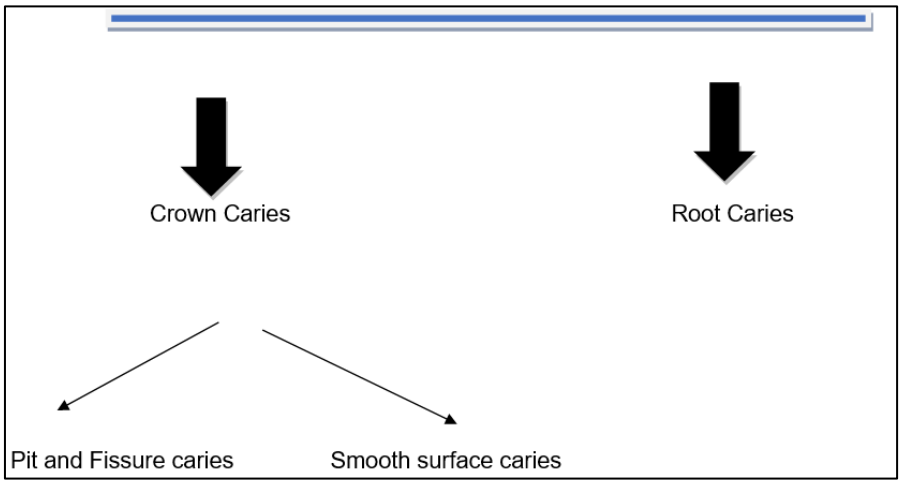
OTHER PREDISPOSING FACTORS

- Overindulgence of parent
- Crowded homes
- Child who has less sleep
- Malnutrition
- Xerostomia



CLASSIFICATION

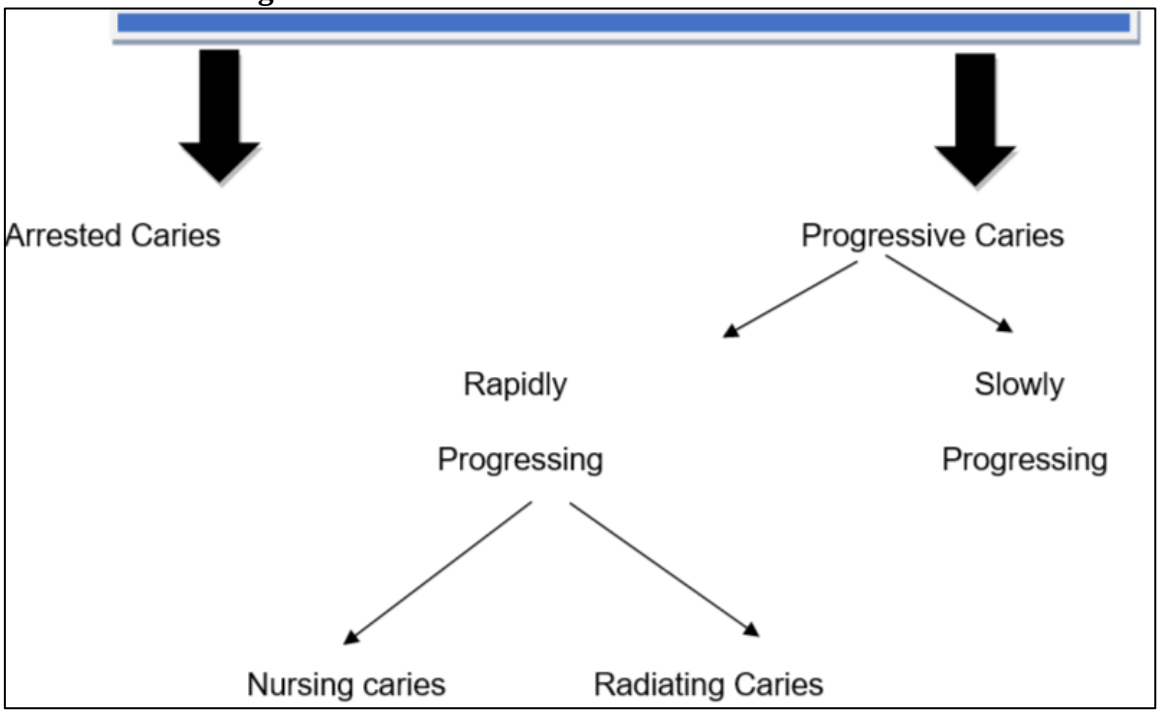
1. Based on the anatomic site



2. **Based on the severity of ECC and etiology[16]-**

- **Type-1 Mild to Moderate ECC**: Isolated carious lesion involving molars and incisors. It is caused by a combination of cariogenic semisolid food and poor oral hygiene. Found commonly in 2-5 years of age.
- **Type-2 Moderate to Severe ECC:** Labio-lingual carious lesions involving maxillary incisors, with/without molar involvement. Etiology is feeding bottle or poor oral hygiene. It mainly occurs after the eruption of 1st tooth.
- **Severe ECC:** involves all teeth including mandibular incisors. Caused by a combination of cariogenic food and poor oral hygiene. Usually seen in 3-5 years of age. Rampant in nature and include immune tooth surfaces.

3. **Based on the Progression of the lesion:**



4. **Based on the pattern of ECC presentation:[17]**

- **Type-1:** Lesion associated with developmental defects (Pit and fissure defects and hypoplasia)
- **Type-2:** Smooth surface lesion (Labial-lingual lesions)
- **Type-3:** Rampant caries having caries in 14 out of 20 primary teeth, at least one mandibular incisor.

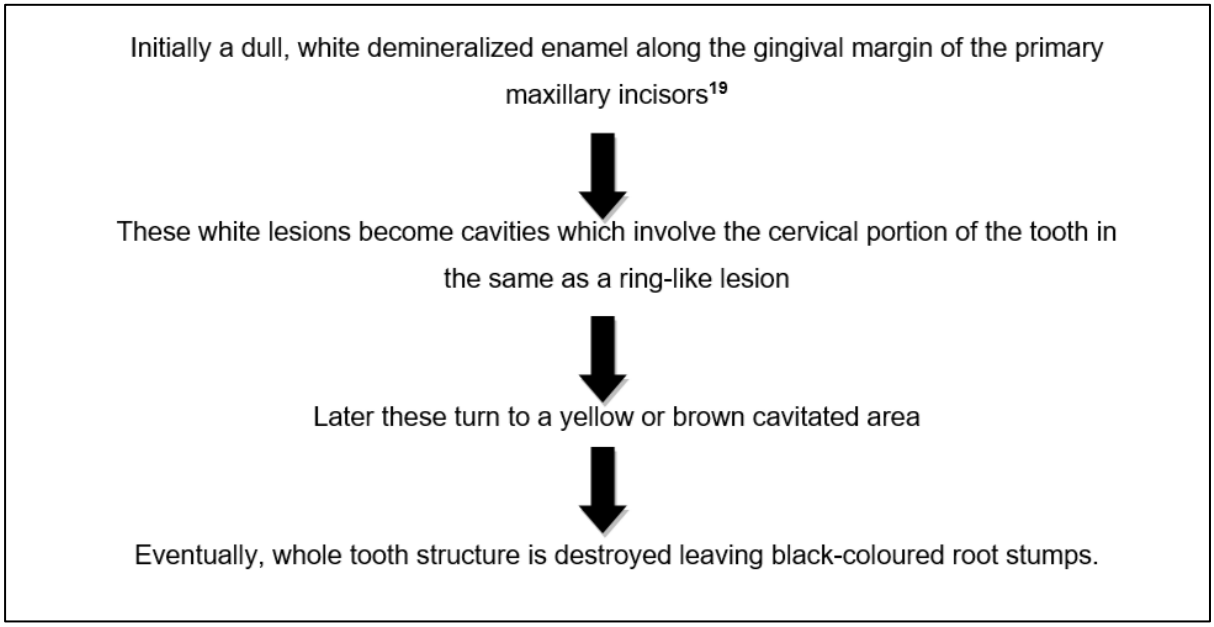
5. **Classification of ECC and Severe Early Childhood Caries:[18]**

Age (months)	Early Childhood Caries	Severe Early Childhood Caries
<12	1 or more dmfs* surfaces	1 or more smooth dmf* surfaces.
12–23	1 or more dmfs* surfaces	1 or more smooth dmf* surfaces.
24–35	1 or more dmfs* surfaces	1 or more smooth dmf* surfaces.
36–47	<1 or more dmfs* surfaces	1 or more cavitated, filled, or missing (due to caries) smooth surfaces in primary maxillary anterior teeth or dmfs* score >4.
48-59	1 or more dmfs* surfaces	1 or more cavitated, filled, or missing (due

		to caries) smooth surfaces in primary maxillary anterior teeth or dmfs* score >5.

***Dmf- Decayed, missing, filled**

MECHANISM



Primary maxillary incisors are generally affected earlier than the four maxillary anterior teeth which are often involved concurrently. Carious lesions may be found on either the labial or lingual surfaces of the teeth and, in some cases, on both.[20]

PREVENTION

Early childhood caries prevention begins with the education of the parents by enlightening them about its etiology, along with maintaining good oral hygiene and frequent visit to the dentist for both dental treatments as well as follow-up. Infants should not be put to sleep with a bottle. Ad. libitum nocturnal breastfeeding should be avoided after the first primary tooth begins to erupt. Studies have shown a remarkable reduction or delay of ECC in infants who maintain oral hygiene during pregnancy.[21] Frequent fluoride application on teeth is considered a successful treatment modality. Other options that reduce the chance of ECC are Probiotic chewable tablets or supplements shown evidence in controlling caries.[22] Effective approach includes the use of chlorohexidine gluconate in the form of mouth rinses, and gels to reduce oral microorganisms.[23]

Prevention Strategies	**Technique**
Home Care	Dietary habits
	Maintain good oral hygiene
	supplements
	Fluoride dentifrice, gels

Prevention Strategies	**Technique**
Professional	Fluoride application as varnish, foams or gels
	Pit and Fissure Sealant

Prevention Strategies	**Technique**
Community	Water fluoridation
	Dental education

TREATMENT

ECC is an alarming problem because the disease is widespread amongst young children and, if untreated, can lead to serious disability.[24]

RESTORATIVE THERAPY

- Carious lesions are excavated and restored.
- Instructions regarding oral hygiene and dietary habits are given.
- Pulpal treatment such as indirect pulp capping, direct pulp capping, pulpotomy, pulpectomy may be performed.
- Stainless steel crowns can be given for grossly decayed or endodontically treated teeth.
- If the teeth are beyond repair, extraction followed by a space maintainer is advocated.
- Recall after every 3 months.

CONCLUSION

Early childhood caries is a preventive and manageable disease with the right skill and information. Early diagnosis helps in maintaining proper dentition. It can affect a child's well-being, learning ability, and quality of life. This form of dental caries begins soon after dental eruption mainly on the smooth surfaces of the teeth, which progress at a rapid state. Hence both prevention and oral health promotion should be included as an integral part of the disease of disease prevention.

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