Early Childhood Caries

Wan Kim Seow, BDS, MDSc, PhD, DDSc

KEYWORDS

• Early childhood caries • *Streptococcus mutans* • Prevention • Preschool children
• Primary dentition

KEY POINTS

- Early childhood caries (ECC) is highly prevalent in poor and socially disadvantaged communities.
- The main risk factors for ECC are oral colonization with cariogenic bacteria, frequent consumption of sugar, lack of tooth brushing, and enamel hypoplasia.
- Contributory factors for ECC include environmental and psychological stresses that adversely influence caregiver preventive oral care behaviors.
- Strategies for ECC prevention include reducing mutans streptococci transmission from caregivers to infants, restricting dietary sugars, tooth brushing, topical fluoride applications, and early dental visits.

INTRODUCTION

Early childhood caries (ECC) refers to caries found in the primary ("milk") teeth of children younger than 6 years of age.[1] Despite significant advances in preventive dentistry, ECC continues to affect large numbers of children globally.[2] ECC is one of the most common chronic childhood diseases, and the largest prevalence is found in poor, socially disadvantaged, and minority groups.[3–15] This article aims to provide an overview of ECC based on current understanding of its cause, prevention, and management.

WORLDWIDE PREVALENCE OF EARLY CHILDHOOD CARIES

Although representative data are sparse, general reports from several countries show that the prevalence of ECC in 2- to 3-year-old children is approximately 12% to 27%.[4–8] In 4- to 6-year-old children, the prevalence generally ranges from 27% to 48%,[8–11] with more than 76% reported from the Middle East.[12] Indigenous communities in Australia, United States, and Canada have high ECC prevalence rates of 60% to more than 90%.[13–15]

School of Dentistry, The University of Queensland, 288 Herston Road, Herston, Queensland 4006, Australia
E-mail address: k.seow@uq.edu.au

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CLINICAL PRESENTATIONS

ECC usually starts on the maxillary primary incisors (Fig. 1), followed sequentially on first molars, canines, and second molars in accordance with the eruption pattern of the teeth. Clinically, the first visible signs of caries may be subsurface lesions appearing as white-yellow linear ("white-spot") lesions adjacent to the gingival (gum) margins (Fig. 2). These white-spot lesions usually cavitate within a short period of time because of the relative thinness of primary enamel. A severe form of ECC that is associated with enamel hypoplasia is termed "hypoplasia-associated severe-ECC" (HAS-ECC) (Fig. 3).[16] HAS-ECC is commonly seen in very young children living in poverty and needs to be recognized as a separate, high-risk, clinical entity because it usually warrants a different, targeted approach.

COMPLICATIONS OF EARLY CHILDHOOD CARIES

Caries in young children causes mouth pain and dental abscesses, eating difficulties, and reduced weight and body mass index for age compared with healthy children.[17] ECC is associated with poor quality of life,[18] including multiple emergency room visits,[19] sleep disturbances,[20] missed school days, and lower academic performance.[21] Also, early extractions of primary teeth due to ECC may lead to malocclusions. Finally, children with ECC have a higher risk for future caries.[22]

CAUSE OF EARLY CHILDHOOD CARIES

The cause of ECC is multifactorial and complex. The traditionally taught Keyes' etiologic caries triad of bacteria, sugar, and tooth surface is greatly affected by sociocultural and environmental factors that modify oral care behaviors, sugar intake, and access to dental services.[23] The cariogenic bacteria (*Streptococcus mutans*, *Streptococcus sobrinus*, and lactobacilli) reside in the dental biofilm and produce acids by fermenting dietary sugars.[24] When the pH drops below a critical level, the tooth surface starts to demineralize (ie, loss of calcium and phosphate mineral).[25] The mineral loss may be reversed by salivary factors (high salivary flow results in clearance, buffering, and increased calcium supply), and remineralization is facilitated by the presence of fluoride. The processes leading to caries involve dynamic cycles of demineralization and remineralization of the tooth surface.[25] Over time, when the demineralization effects are greater than remineralization, the outcome is a carious lesion.

Although the pathogenesis of ECC is similar to other types of dental caries, ECC is usually widespread and rampant, most likely due to the immaturity of the newly

Fig. 1. A 2-year-old child with severe ECC.