CLINICAL PEDIATRIC DENTISTRY I
10

EARLY CHILDHOOD CARIES

(DENTISTRY FOR THE CHILD AND ADOLESCENT, 8\ED
McDonald, Avery Dean, 2005; Chapter 10, pages 209-217 (only)

Tuesday 19\11\2013
1:00 pm-2:00 pm
Learner Objectives

Upon completion of this presentation, participants will be able to:
1. Define caries and Early Childhood Caries (ECC).
2. Name the primary bacteria involved in the caries process.
3. Discuss the contribution of carbohydrate metabolism in caries development.
4. State the important protective benefits of saliva.
5. List risk factors and describe the oral manifestations of ECC.
6. Describe the 5 stages of ECC and identify early lesions on physical exam.
7. Discuss the impact of ECC on overall health and well-being.
8. Recall the 6 major methods of preventing ECC.
There are 4 requirements for the formation of dental caries:
1. Bacteria
2. Sugar
3. Teeth
4. Time

Because dental caries is an infectious process, caries cannot form in the absence of bacteria, regardless of sugar intake. Bacteria adhere to the tooth surface in a biofilm called dental plaque. When carbohydrates are consumed, they are metabolized by bacteria and produce acid as a byproduct. The acid causes demineralization of the tooth enamel.
Etiology and Pathophysiology

The following factors contribute to demineralization:
1. High oral bacterial load
2. Frequent feedings
3. Poor oral hygiene
4. Decreased saliva production

These factors aid in the remineralization process:
1. Saliva
2. Good oral hygiene
3. A non-cariogenic diet

However, it is possible to reverse the demineralization process before cavitation occurs.
Etiology and Pathophysiology

Dental caries:

is a common chronic infectious transmissible disease resulting from tooth-adherent specific bacteria, primarily mutans streptococci (MS) that metabolize sugars to produce acid which, over time, demineralizes tooth structure.
EARLY CHILDHOOD CARE IS ECC

- Tooth decay is the single most common chronic childhood disease
- 5 times more common than asthma
- 4 times more common than early childhood obesity
- 20 times more common than diabetes
EARLY CHILDHOOD CARE IS EC

- Nursing bottle caries.
- Baby bottle tooth decay.
- Nursing bottle syndrome.
- Rampant caries.
What is early childhood caries?

The disease of ECC is the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces, in any primary tooth of a child under the age 6 Years.
What is severe early childhood caries?

Severe early childhood caries (S- ECC) is:

1. In children younger than 3 years of age, any sign of smooth-surface caries is indicative of severe early childhood caries (S-ECC).
What are severe early childhood caries?

2. From ages 3 through 5, 1 or more cavitated, missing (due to caries), or filled smooth surfaces in primary maxillary anterior teeth.
What are severe early childhood caries?

3. A decayed, missing, or filled score of dmft $\geq 4$ (age 3).
4. dmft $\geq 5$ (age 4).
5. dmft $\geq 6$ (age 5).
There is early carious involvement of the maxillary anterior teeth, the maxillary and mandibular first primary molars, and sometimes the mandibular canines. The mandibular incisors are usually unaffected. A discussion with the parents often reveals an inappropriate feeding pattern: the child has been put to bed at afternoon naptime and/or at night with a nursing bottle holding milk or a sugar-containing beverage. The child falls asleep, and the liquid becomes pooled around the teeth (the lower anterior teeth tend to be protected by the tongue). It would seem that the carbohydrate-containing liquid provides an excellent culture medium for acidogenic microorganisms. Salivary flow is also decreased during sleep, and clearance of the liquid from the oral cavity is slowed.
BACTERIA
The primary bacteria involved in the pathogenesis of caries is *Streptococcus mutans*, but *many* other bacteria have also been implicated, including *S. sobrinus*, *Actinomyces* sp, and *Lactobacillus* sp. Increased numbers of bacteria increases a child’s risk for caries. The type of *S. mutans* cannot be modified, but the *number* of bacteria can be altered.

These methods can be used to decrease bacteria and minimize caries:

1. Brushing
2. Flossing
3. Professional dental cleanings
4. Fluoride use
5. Chlorhexidine mouthrinses and Xylitol use
S MUTANS

S mutans is transmitted from the primary caregiver to infant by saliva.

Transmission rates increase when parents:

1. Share utensils or toothbrushes.
2. Taste food or drink before serving it.
3. “Clean” a dropped pacifier with saliva.
4. Allow a child to place fingers into an adult's mouth.
SUGAR

Caries formation is promoted through the following activities:

• Frequent or prolonged contact of the teeth with sugary substances.

• Consumption of sticky foods.

• Dipping a pacifier in sweeteners like honey or corn syrup.

• Regular use of medications that contain sucrose, including some multi-vitamins.
Saliva has several important properties that help to protect against caries:

- Saliva buffers acid.
- Saliva is *bacteriostatic*.
- Saliva aids in remineralizing the teeth.
- Decreased saliva production promotes development of caries.
PRESENTATION AND TEETH AFFECTED

ECC affects teeth that erupt first, those least protected by saliva, and those with grooved surfaces.

ECC tends to affect the upper (maxillary) incisors first because they erupt earliest.

The primary molars are affected next because of their grooved surfaces.

Food easily becomes lodged in the molar’s pits and fissures, which are difficult areas to clean with a toothbrush.

The canines tend to be spared because they are smooth teeth that erupt later.

The lower teeth are better protected by saliva and the tongue.
DIAGNOSIS AND STAGES

The stages of ECC are as follows:

1. Plaque: This biofilm contains cariogenic bacteria.

2. Incipient lesions or white spots: Usually begin along the gum line, which is the most important place to examine for ECC. With intervention at this stage, the caries process is entirely reversible.

3. Enamel caries: A defect in the enamel surface is visible.

4. Dentine caries: ECC has extended into the dentine layer, where the nerve and pain fibers are located.

5. Pulpitis: The infection has spread so that it now involves the pulp.
Risk Factors for ECC

Social/Environmental Characteristics: Ethnicity, minority or low socioeconomic status, Parents with less than a high school education, Limited or no dental insurance, Limited or no access to dental care, Inadequate fluoride exposure, Caries in a parent or sibling (especially in the past 12 months), High levels of S mutans in parents

Physical Characteristics: Children with special health care conditions, Low birth weight (less than 2500 grams), Gingivitis, Chronic conditions that weaken enamel, promote gingivitis, or cause decreased saliva production, Visible plaque on the teeth, Caries in the child

Behavioral Risk Factors: Poor nutritional/feeding habits, Poor oral hygiene
PREVENTING ECC

Physicians who care for children Should teach the following methods to prevent or delay caries:

1. Improve oral hygiene.
2. Alter feeding/eating practices.
3. Delay colonization of the teeth.
4. Ensure adequate fluoride.
5. Establish dental care, such as a dental home.
6. Use dental sealants.
EARLY CHILDHOOD CARE IS ECC

- Is highly prevalent.
- Is largely untreated in children under age 3.
- High numbers of teeth affected.
- Consequences.
WHY IS THIS BABY SMILING?

She's smiling because she's happy! She is safe from early childhood caries.
IMPACT AND EFFECTS ON HEALTH

CONSEQUENCES:

1. Higher risk of new carious lesions in both dentitions.
2. Hospitalizations.
3. Emergency room visits.
4. Increased treatment costs.
5. Risk for delayed physical growth and development.
6. Loss of school days.
7. Increased days with restricted activity.
8. Diminished ability to learn.
9. Diminished oral health-related quality of life.
10. Destruction and loss of teeth
11. Damage to permanent teeth
EARLY CHILDHOOD CARE IS ECC

Early childhood caries may cause:

- Pain
- Many cavities
- Crooked permanent teeth
- Ear and speech problems
- Possible emotional problems
EARLY CHILDHOOD CARE IS ECC

- Infectious
- Transmissible
- Diet Dependent
- Fluoride Mediated
- Reversible

Acquisition of the caries-causing bacteria Streptococcus mutans in children to occur through the transmission of the bacteria from mother to child.
EARLY CHILDHOOD CARE IS ECC

The following slides show the progression of Early Childhood Caries.

- Infectious
- Transmissible
- Diet Dependent
- Fluoride Mediated
- Reversible
Infectious/Transmissible

- Transmitted mainly from mother or primary caregiver to infant
- Window of infectivity is first 2 years of life
- Earlier child colonized, the higher the risk of caries
ECC Causes - Bacteria

Passed from caregiver to child

- food/drink
- utensils
- toothbrushes
- Blowing on or
- prechewing food

More likely if mother has

Decay Early spread increases decay risk
Diet Dependent

- Caries is promoted by carbohydrates, which break down to acid.
- Acid causes demineralization of enamel.
- Frequent snacking promotes 20 minute acid attacks.
- Foods with complex carbohydrates (breads, cereals, pastas) are major sources of “hidden” sugars.
- High sugar content in sodas, Kool-aid, Hi-C, Snapple etc.
ECC Causes - Diet

- Food type
  - Starchy foods
  - Added or natural sugar
  - Pacifier dipped in sweetener
  - Liquid medicine
Feeding Habits that contribute to ECC

- Bottles and sippy cups with fruit juice, soft drinks, powdered sweetened drinks, formula, or milk
- Sticky foods like raisins/fruit leather (roll-ups), and suckers
- Bottles at bedtime or nap time not containing water
- Dipping pacifier in sugary substances
ECC Causes - Time

- Frequency and length of feeding
  - Bedtime bottle
  - “At will” nighttime nursing
  - “Carry along” bottle or no-spill training cup
  - Frequent snacking
Not Just What We Eat, But How

- Acids produced by bacteria after sugar intake persist for 20 to 40 minutes.
- Number of times sugar is ingestion is more important than quantity.
AAP Recommendations for an Oral Health Risk Assessment

 Assess mothers’/caregiver’s oral health.

 Assess oral health risk of infants and children.

 Assess child’s exposure to fluoride.

 Recognize signs and symptoms of caries.

 Provide anticipatory guidance including oral hygiene instructions (brush/floss).

 Make timely referral to a dental home.
High-Risk Groups for ECC

- Children with special health care needs
- Children from low socioeconomic
- Children that lack topical or systemic fluoride
- Children with poor dietary and feeding habits
- Children whose caregivers and/or siblings have caries
- Children with visible caries, white spots, plaque, or decay
Professionally Applied Topical Fluorides (PATFs)
Includes gels, foams, in office rinses and varnishes

- Safe, effective, easy to apply
- Promotes remineralization of enamel, arrest and/or reverse early caries
- Decreases enamel solubility
- Inhibits the growth of cariogenic organisms, thus decreasing acid production
Why recommend a fluoride varnish?

To prevent dental caries and in many cases reverse early dental caries

- Baby teeth are in a child’s mouth until about age 11 or 12
- No dental cleaning necessary prior to application
- No special equipment
- Quick, easy to apply (2 minutes)
- Sustainable service
How does the varnish work?

- The lacquer-based product adheres to the dental enamel forming a depot from which fluoride is slowly released
- Making the tooth more resistant to acid dissolution
- Saliva actually sets the varnish
Advantages fluoride varnish:

Easy to apply

Teeth do not need professional prophylaxis

Children can eat and drink following applications

Potential ingestion of fluoride is low

Prevents ECC
Q # 1

Through which of the following mechanisms does saliva inhibit caries formation?

A. Supplying fluoride to aid in tooth remineralization.
B. Removal of dietary carbohydrates from tooth surfaces.
C. Buffering of acid.
D. Providing calcium and phosphate to aid in remineralizing the teeth.
E. All of the above.
The risk of caries development is directly related to the frequency with which the teeth are exposed to sugar.

A. True.

B. False.
Which of the following helps to prevent or delay dental caries?

A. Limiting snacks between meals.
B. Ensuring adequate fluoride.
C. Improving oral hygiene.
D. Establishing a dental home.
E. All of the above.
Q # 4

Which teeth do Early Childhood Caries tend to affect first?

A. Mandibular molars.
B. Maxillary incisors.
C. Mandibular incisors.
D. Maxillary molars.
E. All teeth are equally affected.
Which of the following bacteria is the primary pathogen implicated in the development of dental caries?

A. Streptococcus salivarius.
B. Streptococcus mutans.
C. Bacteroides sp.
D. Streptococcus viridans.
E. Actinomyces sp.
THANKS FOR YOUR KIND ATTENTION
References


