CARIES RISK ASSESSMENT IN YOUNG CHILDREN AND ITS SIGNIFICANCE IN CARIES PREVENTION

By: Dr. Nick Lekic DMD, M.Dent, FRCD(C)
Introduction

- Completed all my studies at the University of Manitoba
  - DMD Degree in 2010
  - Pediatric hospital dentistry residency in 2011
  - Master of Dentistry-Pediatric Dentistry Graduate Program in 2014
- Fellow of the Royal College of Dentists of Canada in 2014
- Joined Children’s Dental World in July 2014
Course objectives

- Comprehending the multi-factorial nature of caries development and the association between presence of risk factors and caries susceptibility
- Understanding the principles and application of caries-risk assessment for caries prevention in everyday clinical practice
Introduction

- Early childhood caries (ECC) has been found to be the most prevalent chronic disease.
- ECC is rapidly progressing and significantly affecting a child’s growth and developmental.
- Early assessment and identification for presence of caries-risk factors is critical for prevention of ECC.
- Restorative treatment alone may not be sufficient and overall requires modification to a child’s daily life practices.
Introduction

- The American Academy of Pediatric Dentistry (AAPD) and Canadian Academy of Pediatric Dentistry (CAPD) advise that the first dental check up should occur within 6 months of the eruption of the first tooth and no later than 12 months of age.

- Importance of establishing a dental home is to provide a continuous relationship between the dentist and the family.
Caries development

- Understanding caries etiology may lead to improved provision of preventive measures
- Caries is a multifactorial disease
- Pathologic factors include: cariogenic bacteria, salivary dysfunction and carbohydrates intake
- Additional risk factors include sociodemographic, presence of plaque, lack of fluoride and environmental effects (i.e. enamel hypoplasia)

http://www.ohiodentalclinics.com/curricula/sealant/mod3_1.html
S. Mutans and caries-risk

• Presence of *Streptococcus mutans* in young caries-free children has been associated with a considerable caries risk
  • Its has also been shown to be a reliable indicator of future caries status

• *S. mutans* may invade oral cavity soon after birth
  • Two modes of transmission with a window of infectivity seen as early as birth
  • Eruption of primary teeth increases the number and complexity of bacteria

S. Mutans and caries-risk

- Bacterial and host factors affect transmission and colonization of *Streptococcus mutans*
- *S. mutans* are acidogenic, aciduric, adherent to teeth and capable of secreting carbohydrates
- Screening for *S. mutans* may identify caries risk
Salivary dysfunction and caries-risk

- Saliva contains minerals, proteins, immunologic factors and buffers which all play a part in caries prevention.
- Saliva also has a mechanical role of washing away debris from the oral cavity.
Salivary dysfunction and caries-risk

- Studies have found salivary dysfunction to be associated with an increased caries risk
  - Salivary flow rate less than 0.8-1.0 ml/min is an indicator of caries risk
- Salivary flow may be reduced by illnesses, medications and radiation therapy
Refined carbohydrates cause a measurable drop in pH and increase a child’s caries risk.

Carbohydrates that are a greater risk for caries development in particular are:
- Retentive,
- Increased sugar content,
- Result in decreased salivary flow,
- Consumed more frequently.
Children with delayed weaning from the bottle and with prolonged nighttime feeding with sugar containing products are at an increased risk for dental decay.

- Studies reported as high as 86% caries in the maxillary primary incisors.
Diet and caries-risk

- Although no study has found human breast milk as cariogenic, its combination with sugar may increase caries risk.
  
  - A systematic review reported that prolonged breast-feeding at night for greater than a year following the eruption of the primary teeth may be associated with ECC.
Recent studies have shown that although sugar consumption has a proven role in the development of caries, the increased exposure to systemic fluoride has lessened its affect. Water fluoridation may decrease the caries risk of carbohydrate intake.
Caries-risk assessment

- A risk-based approach to caries management enables identification of patients who are most vulnerable to the development of this disease.
- Caries-risk assessment should be predictable, repeatable and easily accomplished by all members of the dental team.
The goal of the caries risk assessment is to minimize causative factors and maximize protective factors.

The current best predictor of future caries is past caries experience.
Several Caries-risk assessment tools have been created for everyday clinical practice

- AAPD Caries-risk assessment
- AAP – Oral Health Risk assessment Tool
- ADA – Caries-risk assessment form
- CAMBRA (Caries management by risk assessment)
Caries-risk assessment

- The AAPD Caries-risk assessment tool has become the principle guide for early assessment of children.
  - The three main factors for caries risk assessment in children include biological, protective, and clinical findings.

Google images of caries and primary teeth
Caries-risk assessment

- **Biological risk factors**
  - Mother/primary caregiver with carious lesions
  - Socioeconomic status of the family
  - Child has 3 or more between meal sugar containing snacks or beverages a day
  - Child is put to bed with a bottle containing sugar
  - Special health care needs child
  - Child is a recent immigrant
Caries-risk assessment

- Protective risk factors
  - Child’s water fluoridation or fluoride supplements consumption
  - Daily oral hygiene with fluoridated toothpaste use
  - Professional topical fluoride application
  - Child has regular dental recall appointments
  - Additional preventive measures (i.e. xylitol)
Caries-risk assessment

- Clinical risk factors
  - Child has one or more decayed/missing/filled tooth surface
  - Child has active white spot lesions or enamel defects
  - Child has elevated S. mutans levels
  - Child has visible plaque on teeth

Google image of white spot lesions
In our study, higher levels of *S. mutans* were associated with increased caries experience.

Contrary, children with low *Streptococcus mutans* levels were significantly less likely to develop new dental caries.

Findings suggest that chair-side Immunoassay tests for *Streptococcus Mutans* counts could be used to assess caries risk and encourages clinicians to provide anticipatory guidance to their patients to help avoid the development of new caries.
Caries-risk assessment

- A simple and quick 15 minute chair-side Immunoassay test was conducted to determine levels of *S. mutans* using Saliva-Check Mutans
- The test was positive with the levels for *S. mutans* determined as high at $>5 \times 10^5$ CFU/ml
Caries-Risk assessment

- Video of chair-side Immunoassay test with Saliva-Check Mutans performed by myself to be inserted here
<table>
<thead>
<tr>
<th>Factors</th>
<th>High Risk</th>
<th>Moderate Risk</th>
<th>Low Risk</th>
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</thead>
<tbody>
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<td><strong>Biological</strong></td>
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<td><strong>Protective</strong></td>
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Clinical implications of caries-risk assessment

- Caries management and determined time period for recalls is dependent on the caries-risk status of the patient, age and compliance.
- Efficient caries management requires self-management goals and with proper identification and prevention of risk factors, caries progression may be hindered or stopped entirely.
- Patients that are at higher risk should be followed-up more frequently (i.e. every 3 months) with professional application of topical fluoride, whereas patients in the low risk group can be seen less frequently (i.e. every 12 months).
# Caries-risk management

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Diagnostic</th>
<th>Fluoride</th>
<th>Diet</th>
<th>Sealants</th>
<th>Restorative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Recall 6-12 months&lt;br&gt; Radiographs 12-24 months&lt;br&gt; Baseline MS</td>
<td>Twice daily with fluoridated toothpaste</td>
<td>No</td>
<td>Yes</td>
<td>Surveillance</td>
</tr>
<tr>
<td>Moderate</td>
<td>Recall 6 months&lt;br&gt; Radiographs 6-12 months&lt;br&gt; Baseline MS</td>
<td>Twice daily with fluoridated toothpaste&lt;br&gt; Professional topical fluoride every 6 months</td>
<td>Counseling</td>
<td>Yes</td>
<td>Active surveillance of incipient lesions&lt;br&gt; Restoration of cavitated or enlarging lesions</td>
</tr>
<tr>
<td>High</td>
<td>Recall 3 months&lt;br&gt; Radiographs 6 months&lt;br&gt; Baseline and follow-up MS</td>
<td>Twice daily with fluoridated toothpaste&lt;br&gt; Professional topical fluoride every 3 months&lt;br&gt; Fluoride supplements</td>
<td>Counseling</td>
<td>Yes</td>
<td>Active surveillance of incipient lesions if parents engaged, otherwise restoration of incipient, cavitated or enlarging lesions</td>
</tr>
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Conclusion

- Reducing caries-risk is the most important element in caries prevention.
- Proper oral hygiene, decreased presence of cariogenic bacteria, reduced carbohydrate intake, adequate fluoride exposure and adequate salivary flow are all important components in caries prevention.
- To achieve this goal, frequent dental visits that begin at latest by 12 months of age is essential for implementation of all preventive and caries management measures.
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Thank you for your attention