New methods of caries risk assessment and management in children

David Manton  BDSc, MDsc, PhD, FRACDS, FICD, FADI
Elsdon Storey Chair of Child Dental Health
Melbourne Dental School
Current thoughts on MiD

The chance for MID to be successful is thought to be increased tremendously if dental caries is not considered an infectious but instead a behavioural disease with a bacterial component.
Controlling the two main carious lesion development related behaviours, i.e.:

intake and frequency of fermentable sugars

….and removing/disturbing dental plaque …. 
Why are we here today?

The Maintenance of Oral Health
Establish a ‘dental home’ by 1 yr at the latest

Caries Risk
Early cleansing habits
F paste after eruption?
Anticipatory Guidance re feeding
RISK ASSESSMENT
Who should we target?
Risk Assessment

Does parental caries risk transfer?
ECC & Risk Assessment of Mother

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>p value</th>
<th>AOR</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Caries presence first detected by 30 months</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s MS presence at 18 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not detected</td>
<td>1</td>
<td>3.0–32.7</td>
<td>&lt;0.001*</td>
<td>6.3</td>
<td>1.7–23.2</td>
<td>0.005*</td>
</tr>
<tr>
<td>Present</td>
<td>9.8</td>
<td></td>
<td></td>
<td>6.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Caries presence first detected at 36 months</strong></td>
<td></td>
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<tr>
<td>Child’s MS presence at 18 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Detected</td>
<td>1</td>
<td>1.6–11.8</td>
<td>0.003*</td>
<td>4.9</td>
<td>1.4–17.5</td>
<td>0.01*</td>
</tr>
<tr>
<td>Present</td>
<td>4.4</td>
<td></td>
<td></td>
<td>4.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s MS counts at 36 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not detected</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10⁵ CFU/ml</td>
<td>9.8</td>
<td>2.0–48.1</td>
<td>0.005*</td>
<td>0.1</td>
<td>0.0–0.6</td>
<td>0.01*</td>
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<tr>
<td>&gt;10⁵ CFU/ml</td>
<td>10.2</td>
<td>1.8–56.0</td>
<td>0.008*</td>
<td>0.2</td>
<td>0.0–1.2</td>
<td>0.08</td>
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<tr>
<td><strong>Mother having dental cavitation at baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td></td>
<td></td>
<td>5.8</td>
<td>0.0–0.5</td>
<td>0.003*</td>
</tr>
<tr>
<td>Yes</td>
<td>5.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Do you transfer risk by giving the child a kiss or ‘licking’ the dummy?

Or is it environmental?

SES

Parental Dental Health

Education
Oral Health Care During Pregnancy: A National Consensus Statement

Simple Positive Advice

After Your Baby Is Born

- Continue taking care of your mouth after your baby is born. Keep getting oral health care, practicing good oral hygiene, eating healthy foods, and practicing other healthy behaviors.

- Take care of your baby’s gums and teeth, feed your baby healthy foods (exclusive breastfeeding for at least 4 months, but ideally for 6 months), and take your baby to the dentist by age 1.

- Ask your baby’s pediatric health professional to check your baby’s mouth (conduct an oral health risk assessment) starting at age 6 months, and to provide a referral to a dentist for urgent oral health care.

Resource

SUGAR
=
CARIES!

RESEARCH ARTICLE
Sugar Industry Influence on the Scientific Agenda of the National Institute of Dental Research’s 1971 National Caries Program: A Historical Analysis of Internal Documents
Cristin E. Kearns1,2,3, Stanton A. Glantz1,2,4,5,6, Laura A. Schmidt1,2,4,7

Oral Health CRC
Why have we concentrated on ‘curative’ options?

‘adopted a strategy to deflect attention to public health interventions that would reduce the harms of sugar consumption rather than restricting intake.’
Why have we concentrated on ‘curative’ options?

The main problem is determining what people eat, and when you have, getting behavioural change.
The child
Identify Caries Risk Factors Early

General
- Diet – nocturnal feeding *ad libitum*, bottle fluids, hidden free sugars
- Parent’s (mother’s) untreated carious lesions
- Social / family
- Health
- Medications
- Fluoride
- Age - dexterity

Oral
- Bacterial balance – plaque ecology
- Salivary factors
- OHI / Plaque presence
- Past Caries Experience
Caries experience by sipping from bottle after 6 months old

<table>
<thead>
<tr>
<th>Sipping</th>
<th>N</th>
<th>P value</th>
<th>mean ± SD</th>
<th>Range</th>
<th>n</th>
<th>P value</th>
<th>mean ± SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28</td>
<td>0.02</td>
<td>1.91 ± 2.22</td>
<td>0 – 8</td>
<td>12</td>
<td>0.02</td>
<td>1.03 ± 2.70</td>
<td>0 – 12</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>0.91</td>
<td>0.91 ± 1.70</td>
<td>0 – 7</td>
<td>6</td>
<td>0.19</td>
<td>0.19 ± 0.76</td>
<td>0 – 5</td>
</tr>
<tr>
<td>ALL</td>
<td>54</td>
<td>–</td>
<td>1.60 ± 2.68</td>
<td>0 - 17</td>
<td>18</td>
<td>–</td>
<td>0.40 ± 1.31</td>
<td>0 – 10</td>
</tr>
</tbody>
</table>

1 ICDAS codes 2-6 include white spot lesions
2 ICDAS codes 4-6 does not include white spot lesions
3 Prevalence = dmft >0
4 Based on Pearson’s Chi-square test demonstrating statistical significance of the prevalence of caries between groups
The child examination

- Caries risk assessment
- In the dental chair?
- Clean with brush
- Visual exam – extent depends on behaviour
- Appropriate interventions
- Appropriate advice – motivational interviewing
The child examination - intraoral

- Plaque and its location
  - Disclosing?
- Carious lesions – incl. WSL
- Developmental defects – hypoplasia, hypominalisation
- Radiographs?
- Photos?
Plaque & Salivary tests

• Who to test????
  • New patients
    – Esp. those in need of restorative care
  • Children suspected of having a high caries susceptibility
    – Due to hyposalivation or other factors
    – Maternal caries risk
  • Children requiring complex or extended dental treatment
Early Carious Lesion Detection and Quantification

• Aims

• To identify early stage carious lesions (WSL)

• To quantify WSL

• To determine Caries Risk
Detecting enamel WSL early

- Visual
- Radiographic
- Transillumination & magnification
- Laser Fluorescence
- Light-induced Fluorescence
- AC Impedance
- Photothermal radiometry (?)
ICDAS codes, based on the histological extent of lesions, stage the caries continuum. Images provided courtesy of Dr Andrea Ferreira Zandonà, University of Indiana.
ICDAS's International Caries Classification and Management System (ICCMS™)

Optional elements if “DMF” or “PUFA” required

- M From specified ICDAS codes
- F From 1st digit ICDAS codes
- PUFA

Basic Reporting Tool

Merged Codes Recording System

C+/- Extensive decay

B+/- Moderate decay

A+/- Initial stage decay

0 Sound

Full ICDAS codes Recording System

6 +/-
5 +/-
4 +/-
3 +/-
2 +/-
1 +/-
0

ICDAS - Full code format
+/- = activity status

International Caries Detection and Assessment System (ICDAS) and its International Caries Classification and Management System (ICCMS) – methods for staging of the caries process and enabling dentists to manage caries
HEALING
MiD & Caries management

Reduce risk by:

Educating and managing INDIVIDUALS re diet and OH

Preventing demineralization

Providing chemotherapeutic intervention
Other Risk Factors?
Management of Risk
(Oral) Health Promotion

• Health promotion interventions during pregnancy and after birth

• 20 months of age - the incidence of S-ECC in the test group was 1.7% and in the control group 9.6% ($P < 0.001$).
### Compliance / Adherence?

<table>
<thead>
<tr>
<th>Contact method</th>
<th>Children with ECC (N)</th>
<th>Mean N of carious teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Visit</td>
<td>3 from 188 (1.5%)</td>
<td>1.3 ± 0.58</td>
</tr>
<tr>
<td>Telephone</td>
<td>4 from 58 (6.8%)</td>
<td>3.5 ± 0.7</td>
</tr>
<tr>
<td>Reference</td>
<td>9 from 40 (22.5%)</td>
<td>10.0 ± 1.6</td>
</tr>
</tbody>
</table>

Children with caries at 24 months in the home visits (HV) and telephone contacts (TC) groups compared to reference controls (RC).
Compliance – Child & Parents

• Is change of risk factors possible?
• Is it probable?
• Which Risk factors do we target?
  • Diet
  • OH
  • Remineralisation
  • Parental oral health
• How do we engage the patient and parent/s?
Compliance / Adherence?
Does the microbiome show changes before WSL become apparent?

- At what age?
- Who should we test?
Management Pathways –
the next part of the story
The ICCMS™ is linked to ICDAS

**ICDAS**: flexible and increasingly internationally adopted methods for classifying caries process stages and the activity status of lesions

**ICCMS™**: options for GPs & dental team to integrate and synthesize tooth and patient information, including caries risk status, in order to plan, manage and review caries in clinical (and public health) practice.
Thank You

“There is no better way of concluding this …… than to go back to its beginning: the best scenario would be one in which a child without clinical signs of a carious lesion visits the dentist.”