Pediatric Dentistry Today

What Works in Prevention

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**Do They Work?**

WE WILL COVER THESE TOPICS

* Fluoride
* Chlorhexidine (inconclusive evidence*)
* Calcium remineralization products
* Probiotics
* Toothbrushing
* Flossing
* Recall Intervals (Check-ups)
* IOH
* Diet
* Sealants

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The Arbiters of Prevention Science and Effectiveness

- USPHSPTF
- American Dental Association
- American Academy of Pediatrics
- American Academy of Pediatric Dentistry
- Centers for Disease Control and Prevention
- Systematic Reviews (Cochrane and others)
Preventive Success Not Just Chairside

Community
- Access to Care [dental providers, infant oral health]
- Community Oral Health Resources [fluoridation, sealants]
- Social Capital [oral health priority in community]

Family
- Health Literacy [culture, education]
- Oral Health Coverage [insurance, Medicaid]
- SES [many social factors]

Patient
- Personal Habits [diet, oral hygiene]
- Health Status [absence of overlying systemic disease]
Dental Caries Remains High

Untreated Dental Caries (Cavities) in Children Ages 2–19, United States

Percentage

2–5 years
6–19 years


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A Problem of Prevention Not Restoration

**Figure 2:**

**Prevalence of Untreated Decay**

- **Ages 2-4** (primary teeth)
  - 15% New Zealand
  - 19% United States

- **Ages 5-11** (permanent teeth)
  - 3%

- **Ages 12-17** (permanent teeth)
  - 13%

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*Source: The Pew Charitable Trusts, 2013*
What We Know About Early Childhood Caries (ECC)

* Once established, ECC cannot be eradicated by restoration of teeth
* ECC may be resistant to our current preventive armamentarium
* Children with ECC tend to experience recurrent ECC
* Children with ECC are more prone to decay in their permanent dentition
* Prevention of ECC is the best way to manage the condition
Inconvenience?

ECC Now Linked To:
* Poor school performance
* Child maltreatment
* Parental stress
* More aberrant behavior
* Failure to thrive
* Lower quality of life

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On a population basis, fluoride exposure is a good risk factor. On an individual basis, fluoride is weak. Ambient (halo effect) complicates use of fluoride as a caries risk factor. Paradoxically, you need to be at risk to get a therapy that when missing is considered a risk factor as per the CDC.
*Fluoride Truths*
### Use of Fluoride: Evidence

<table>
<thead>
<tr>
<th>Activity</th>
<th>Studies and Level of Evidence</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoride mouth rinse &lt;6 years of age</td>
<td>Numerous studies</td>
<td>Risk of fluoride ingestion</td>
</tr>
<tr>
<td>Fluoride toothpastes-1500 ppmF</td>
<td>&gt;70 trials</td>
<td>Preventive factor 24%</td>
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<tr>
<td>Toothpastes with F &lt; 550 ppm</td>
<td>Numerous trials</td>
<td>Limited to no evidence to support lower levels of F</td>
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<tr>
<td>High F- 2200 to 2800ppm</td>
<td>Numerous trials</td>
<td>Dose-response relationship-not for children&lt; 6 years</td>
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<tr>
<td>Swallowing toothpaste</td>
<td>Numerous studies</td>
<td>risk of fluorosis (critical period 22-25 months)</td>
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<tr>
<td>Pre-school children-amount of paste</td>
<td>Numerous studies</td>
<td>Reduce risk- smear of paste</td>
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</tbody>
</table>
* Water fluoridation and fluoride toothpaste are for ALL children and need no risk assessment
* Water fluoridation, fluoride toothpaste, and fluoride varnish are supported by the highest level of evidence
* All other fluoride needs a risk assessment component
* Supplementation doesn’t work (well)
* Bottled water has no fluoride
* Still need to measure sole sources of water
* Fluoride is like climate change --- its everywhere
Oral Hygiene Behaviors

- Parents need to perform hygiene until school age
- Observation required through middle school
- Systematic is the key
- Brushing without fluoride toothpaste does not prevent caries
Calcium Remineralization

* Theory is availability of calcium and phosphate in the oral cavity
* May enhance fluoride
* No real clinical evidence of efficacy but lots of in vitro data
* Probably does no harm but fluoride therapy still the standard
Not Much Proof of Non-fluoride Agents

Many dentists use and swear to the effectiveness of non-fluoride caries-preventive agents, but the evidence supporting their clinical effectiveness is lacking.

## Recommendations from the American Dental Association Council on Scientific Affairs Nonfluoride Caries-Preventive Agents Expert Panel.

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Evidence strongly supports providing this intervention</th>
<th>Evidence favors providing this intervention</th>
<th>Evidence suggests implementing this intervention only after alternatives have been considered</th>
<th>Evidence suggests not implementing this intervention</th>
<th>Evidence is lacking; any recommendation for or against is based on expert opinion</th>
</tr>
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<tbody>
<tr>
<td><strong>STRONG</strong></td>
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<td><strong>IN FAVOR</strong></td>
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<tr>
<td><strong>WEAK</strong></td>
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<td><strong>AGAINST</strong></td>
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<td><strong>EXPERT OPINION</strong></td>
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</table>

The panel acknowledges the oral and systemic benefits of lowering the quantity and frequency of sugar consumption and encourages practitioners to provide dietary counseling. The panel also strongly recommends that practitioners first implement evidence-based recommendations regarding topical fluorides and sealants before attempting to use any nonfluoride therapies. The following recommendations may be considered adjuncts to dietary counseling and a regular caries-preventive program offered to patients at higher risk of developing caries.

### Sucrose-free Polysaccharide Gum

- Advise parents and caregivers of children 5 years or older that use of sucrose-free polyol (xylitol only or polyol combinations) chewing gum for 10 to 20 minutes after meals may reduce incidence of coronal caries.
- Advise adults that use of sucrose-free polyol (xylitol only or polyol combinations) chewing gum for 10 to 20 minutes after meals may reduce incidence of coronal caries.
- Advise parents and caregivers of children 5 years or older that the daily use of xylitol-containing lozenges or hard candies that are dissolved slowly in the mouth after meals may reduce incidence of coronal caries (5-8 grams/day divided into two to three doses).

### Chlorhexidine Varnish

- Apply 1:1 mixture of chlorhexidine-thymol varnish every three months to reduce the incidence of root caries.
- Applying 0.5 to 1.0 percent chlorhexidine gel alone or in combination with fluoride for prevention of root caries is not recommended.
- Using 0.12 percent chlorhexidine rinse alone or in combination with fluoride for prevention of root caries is not recommended.
- Applying 1:1 mixture of chlorhexidine-thymol varnish alone or in combination with fluoride for prevention of coronal caries is not recommended.
- Applying 10 to 46 percent chlorhexidine varnish alone or in combination with fluoride for prevention of coronal caries is not recommended.
- Applying 0.5 to 1.0 percent chlorhexidine gel alone or in combination with fluoride for prevention of coronal caries is not recommended.
- Using 0.12 percent chlorhexidine rinse alone or in combination with fluoride for prevention of coronal caries is not recommended.

### Chlorhexidine Rinses

- Source: Tharanoff and Palmer and Johnson and colleagues.
- Source: American Dental Association Council on Scientific Affairs.
- Source: Boonchamp and colleagues.

A regular caries-preventive program includes routine and periodic examination by a dentist, patient education, dietary advice from a health care professional, and appropriate use of professional and home fluoride products and dental sealants.
Probiotics

* Already present in poplit including AAP
* Not as easy as it might seem
* Not supported by science
* Some science suggests that indiscriminant eradication of bacteria sorts for caries-virulent strains

You have got to be kidding! These pearly whites are all capped.

* Brush twice a day, morning and before bed
* Use 1000 ppm fluoride toothpaste
* Don’t rinse afterward
* Begin brushing with first primary tooth
* Manual or powered brushes work
What Does It Mean, Really?

* Really a measure of tooth cleaning
* Gingival health may be a surrogate measure
* Probably reflects an overall attention to oral/general health
* Is counter-intuitive to what we know about the adult population
* Alaluusua et al. found that plaque on the incisors of 1-year-olds allowed 91% of kids to be classified correctly as to risk.

* Wendt et al. found kids who had teeth brushed more often less likely to experience dental caries.

* Two of six studies support anti-caries benefit
* Professionally done flossing may decrease caries in children with no fluoride and poor hygiene
* Two studies showed increase in caries
* “...there is no evidence that flossing is effective in the presence of topical fluoride.”
**Brushing/ Flossing: Evidence**

<table>
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<tr>
<th>Activity</th>
<th>Studies and Level of Evidence</th>
<th>Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brushing frequency</td>
<td>Numerous trials</td>
<td>Preventive factor increases by 14% with each brushing</td>
</tr>
<tr>
<td>Supervision- Children&lt; 6 years</td>
<td>5 studies</td>
<td>Regulates toothpaste use</td>
</tr>
<tr>
<td>Commencing brushing</td>
<td>6 studies</td>
<td>As soon as primary teeth erupt</td>
</tr>
<tr>
<td>Post-brushing rinsing</td>
<td>3 studies</td>
<td>Spit out excess paste; no rinsing</td>
</tr>
<tr>
<td>Timing of brushing</td>
<td>2 studies</td>
<td>At night prior to bed and one other occasion</td>
</tr>
<tr>
<td>Power vs. manual</td>
<td>Numerous studies</td>
<td>Increased motivation in school aged children with power brushes</td>
</tr>
<tr>
<td>Flossing</td>
<td>3 studies</td>
<td>May have a role?</td>
</tr>
</tbody>
</table>

* No recall interval right for all patients
* Some studies found no difference in benefit between 12 and 24 month recalls
* 2-3 month recall interval decreases caries
* 6 month recall interval yields more restorations but less dental caries
* Take Home: Use a caries risk assessment tool
Early professional interventions with infants and parents have no long term financial benefits.

* In a 1967 study, for every year the first examination is delayed after 4 years of age, the expenditures increase incrementally ~ $35.00 (in 2014 $=$248.00) (Doykos)

* In a 2004 analysis (NC Medicaid), the average related cost per child increased 190% if the first visit was at age 5 instead of age 1 (Savage et al)

* In a 2012 study late starters (after age 4) had 3.58 more procedures then early starters (before age 4) and on average spent $360 more over 8 years (Nowak et al)
* Sugar in, milk out
* More processed carbs
* No fresh food in poor
* Pregnancy diet makes kids seek sweet?
* Sugar gene?
* Sugar fix for stress?
The Poor and Nutritional Implications for Oral Health

* Food insecurity
* Limited ability to cook
* Food storage limitations
* Processed carbohydrates
* Lack of access to fresh foods
* Lack of transportation
* Food stamps
* Cyclic discretionary income

**FIGURE 3.1** Households with Children by Food Security Status (2009)

- Food-secure households with children - 78.7%
- Food insecurity among adults only in households with children - 10.7%
- Low food security among children - 9.4%
- Very low food security among children - 1.2%
- Food-insecure households - 21.3%

**SOURCES:**
Dietary Risk Assessment

* Bottle Use: During meals/not at night/ad lib
* Exposure to Sweets: Under 3 times per day
* Juice and Pop Consumption: Counts as sweet exposure
* Eating Patterns: No ad lib sweets/no behavioral use
## Generational Poverty  
Driving forces for decision making are survival, relationships, entertainment  
People are possessions  
World is local  
Fighting resolves conflict  
Value of food is quantity  
Destiny and fate govern  
Education way out but risky

## Middle Class  
Driving forces are work and achievement  
Things are possessions  
World is national  
Words resolve conflict  
Value of food is quality  
Choice governs future  
Education determines future

## Wealth  
Driving forces are social, financial and political connections  
Legacies, one-of-a-kind objects and pedigrees are possessions  
World is international  
Social inclusion or exclusion resolves conflict  
Value of food is presentation  
Artistic and esthetic are important  
Education is for social connections

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**Sealant Evidence**

### Summary of evidence-based clinical recommendations regarding pit-and-fissure sealants.

The clinical recommendations in this table are a resource for dentists to use in clinical decision making. These clinical recommendations must be balanced with the practitioner's professional judgment and the individual patient's needs and preferences.

Dentists are encouraged to employ caries risk assessment strategies to determine whether placement of pit-and-fissure sealants is indicated as a primary preventive measure. The risk of experiencing dental caries exists on a continuum and changes across time as risk factors change. Therefore, caries risk status should be re-evaluated periodically. Manufacturers' instructions for sealant placement should be consulted, and a dry field should be maintained during placement.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>RECOMMENDATION</th>
<th>GRADE OF EVIDENCE</th>
<th>STRENGTH OF RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Caries Prevention</strong></td>
<td>Sealants should be placed in pits and fissures of children's primary teeth when it is determined that the tooth, or the patient, is at risk of developing caries†.</td>
<td>III</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>Sealants should be placed on pits and fissures of children's and adolescents' permanent teeth when it is determined that the tooth, or the patient, is at risk of developing caries†.</td>
<td>Ia</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Sealants should be placed on pits and fissures of adults' permanent teeth when it is determined that the tooth, or the patient, is at risk of developing caries†.</td>
<td>Ia</td>
<td>D</td>
</tr>
<tr>
<td><strong>Noncavitated Carious Lesions†</strong></td>
<td>Pit-and-fissure sealants should be placed on early (noncavitated) carious lesions, as defined in this document, in children, adolescents and young adults to reduce the percentage of lesions that progress†.</td>
<td>Ia</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Pit-and-fissure sealants should be placed on early (noncavitated) carious lesions, as defined in this document, in adults to reduce the percentage of lesions that progress†.</td>
<td>Ia</td>
<td>D</td>
</tr>
<tr>
<td><strong>Resin-Based Versus Glass Ionomer Cement</strong></td>
<td>Resin-based sealants are the first choice of material for dental sealants. Glass ionomer cement may be used as an interim preventive agent when there are indications for placement of a resin-based sealant but concerns about moisture control may compromise such placement†.</td>
<td>Ia</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>D</td>
</tr>
</tbody>
</table>
*Thanks for Your Attention*

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