Best practices and the current evidence base for effectiveness and efficacy of school-based sealant programs

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Disclosures:
• I serve on the National Scientific Advisory Committee for Delta Dental
• I am a consultant for the ADA (Council on Scientific Affairs) and CDC (school based sealant programs)
• I am currently the PI on one study funded by NIH (risk assessment), one funded by Ivoclar (sealants), one funded by the Early Childhood Investment Corporation (caries needs assessment), one by the University of Turku (xylitol), and one funded by the UoM CRTL (online website and virtual clinic)

Outline
1) Overview of Detection and Diagnosis:
   - Traditional Caries Detection Methods
   - Hidden Caries
   - New Methods of Caries Assessment
     - Visual
     - Technology-based
   - Caries Lesion Activity Status
2) Review of Sealant Recommendations and Diagnostic Thresholds for Placing Sealants
   - Sound
   - Carious Lesions
     - Incipient (non-cavitated)
     - Cavitated
“Half of what you are taught as medical students will in 10 years have been shown to be wrong. And the trouble is, none of your teachers knows which half”
(Dr. Burwell, Dean of Harvard Medical School; 2002)

Evidence-Based Practice

Risk-based prevention and disease management have been recognized as the cornerstones of modern caries management
(Featherstone, 2003; Fontana and Zero, 2006)

How much evidence is needed to start making changes in our practice of dentistry?

Changing Environment

Do Traditional Seslars Have a New, Super Magnified World?
Many Advances and Changes in Cariology…

Evidence Based Information

Detection tools and criteria

Operative Dentistry

Risk Assessment tools

Management products

Dentistry of the Future or Science Fiction? Personalized Medicine

Will this knowledge translate into better targeting of specific interventions that would improve the oral or the general health of at-risk populations?

Changes in Caries Epidemiology in the US

- Caries has declined over time
- However, caries still continues to increase with age
It is true evidence for many of our daily caries intervention choices should be much stronger (most reviews conclude the evidence is weak)

So...what can be safely incorporated into practice?

and how?

If evidence challenges and questions current clinical practice, it will affect implementation.

Maintaining an evidence-based knowledge on every aspect of dental practice can be an overwhelming (volume, difficulty to locate, interpret, what if contradictory?)

Clinicians not trained to critically search, evaluate, incorporate research findings (best evidence) into their everyday practice model.

Dental schools, continuing professional education, and organized dentistry have very important roles:

• educate practitioners in the techniques of EBD

• provide repositories of best practices based on sound evidence

(Baehm and Kidd, 2008)
Variety of options change by setting, but the scientific evidence supporting management strategies should be the same.

A 10-year clinical study evaluated bonded and sealed composite restorations placed directly over frank cavitated lesions extending into dentin vs. sealed conservative amalgam restorations and conventional unsealed amalgam restorations (Mertz-Fairhurst et al., 1998).

Prospective study on the sealing of deep caries lesions: 10-year clinical outcomes (L. S. Alves, J. J. Jardim, M. S. Moura, E. F. Oliveira, M. Maltz; American Journal of Dentistry, 2011)

10 years of follow-up: 32 teeth
- 5 fractures
- 1 loss to follow-up

97% 90% 82%
67%

Time

Baseline 6-7 months 1 ½ year 3 years 5 years 10 years

10  years of follow-up: 32 teeth
- 5 fractures
- 1 loss to follow-up

Prospective study on the sealing of deep caries lesions: 10-year clinical outcomes (L. S. Alves, J. J. Jardim, M. S. Moura, E. F. Oliveira, M. Maltz; American Journal of Dentistry, 2011)

At 60 months for 91 patients with at least 48 months follow-up, major failures (irreversible pulpitis, loss of vitality, abscess or unrestorable tooth) were recorded for 18 teeth: 
3 (3%) for the Hall Technique (treatment arm) 
and 
15 (16.5%) for the usual treatment (control) (p = 0.000488; NNT 8).

“…provides strong justification for additional RCTs by using standard treatments that can be replicated in different contexts and among different groups…” (Fontana, Gooch, Junger, 2012, JEBDP, submitted)

Deep carious lesions – Thompson 2008
– removal of ALL infected dentin not required for success

Systematic Reviews - Clinical Evidence

Sealing of non-cavitated caries – Griffin 2008
– effective in reducing caries progression

Sealing of cavitated lesions – Oong 2008
– significantly reduced bacteria levels

Caries removal – Ricketts 2006
– partial CR preferred: reduced exposure risk

Deep carious lesions – Thompson 2008
– removal of ALL infected dentin not required for success
Evidence-Based Clinical Recommendations
For The Use Of Pit-and-Fissure Sealants
Beauchamp et al., 2008; Gooch et al., 2009

Caries Prevention
• Sealants should be placed in pits and fissures of primary and permanent teeth when it is determined that the tooth, or the patient, is at risk of developing caries

Noncavitated Carious Lesions
• Sealants should be placed on early (noncavitated) carious lesions, in children, adolescents and adults to reduce the percentage of lesions that progress

Reasons for Updating Recommendations
• Request from ASTDD
• Current guidelines last revised in 1994
• New information available
  – Effectiveness of sealants in clinical and school programs (Systematic reviews)
  – Caries assessment techniques
  – Prevalence of caries and sealants in the U.S.
  – Sealant materials

Evaluate Pit & Fissure Surfaces

<table>
<thead>
<tr>
<th>Caries-free</th>
<th>Questionable</th>
<th>Enamel Caries</th>
<th>Dentin Caries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal</td>
<td>Seal</td>
<td>Seal</td>
<td>Replace</td>
</tr>
</tbody>
</table>

SEAL
If at risk for caries based on an evaluation of:
• pit & fissure morphology
• eruption status
• caries pattern
• patient’s perception/interest in sealant

DO NOT SEAL
Monitor if the individual and teeth are not at risk

Evaluate sealed teeth for sealant integrity and retention, and caries progression.
Methods

Expert Panel
• Focused review of state of science and practice
• Engaged in discussions
• Relied on published findings of systematic reviews
• “Mined” additional information from studies included in major systematic reviews (multivariate analyses)
• Completed systematic review of sealant effectiveness in managing caries
• Drafted recommendations based on science and expert opinion

Problem: Lack of adoption of sealants

What is the main reason for sealant underutilization?
A. Sealants do not work well
B. There is no evidence for sealants and caries prevention
C. Scare of sealing caries
D. There is no evidence for sealants and caries arrest
E. Sealants are difficult to place

One of the major barriers to providing sealants is the concern of inadvertently sealing over caries

There is wide variation among pediatric dentists in the selection criteria used in deciding whether a dental sealant is the restoration of choice:
• 80% sealed caries-free and questionable occlusal surfaces
• 20% sealed incipient occlusal caries
• None indicated that they sealed overt caries

Primosch and Barr, 2001
• Only 37.4% general dentists and 42.3% pediatric dentists would use a sealant to treat an non-cavitated lesion in a molar of a young patient.

• Almost 40% responded that it was not a good practice to seal in early caries.

• Even if a radiograph showed no evidence of caries into dentin of a molar, 21% of general dentists and 30% of pediatric dentists opted to open the fissure and place a small resin-based restoration. (Tellez et al., JADA 2011)
At this time the panel senses a paradigm shift in the management of dental caries toward improved diagnosis of early non-cavitat ed lesions and treatment for prevention and arrest of such lesions.

What level of assessment do we need for sealant placement?

- "Improved caries detection and diagnostic methods would help determine the appropriate cutpoint or threshold separating the clinical decisions to do nothing or preventively seal, or to therapeutically seal or surgically treat and restore."
- "Theoretically, laser fluorescence could be useful for determining whether a tooth is sound and does not require intervention, has evidence of a low level of caries activity and is an appropriate candidate for a sealant application, or has a higher degree of disease severity that requires surgical intervention. Ideally it could subsequently be used to monitor sealant effectiveness…"

Management of Dental Caries

Detection
Diagnosis
Risk Assessment
Preventive + Non-Surgical Intervention (Medical Model)
Assessment
Oral Health Outcome
Restorative (Surgical) Intervention
What is Dental Caries?

1) chronic,
2) site-specific,
3) multifactorial,
4) dynamic (but not necessarily continuous)
5) disease process (remineralization-demineralization)
6) The disease can be arrested at any point in time.

Dental Caries: is the process that occurs between the interaction of the tooth surface and subsurface with dental plaque

Caries Lesion: Is the manifestation of the stage of the process at one point in time (active or arrested)
What Is It That You **WANT** To Detect?

What Is It That You **NEED** To Detect?

Visually...

- Early enamel caries
- Histologic evidence
- Overt enamel caries
- Overt dentinal caries
- Cavitation

Increasing Probability of Clinical Caries

**Is this Dental Caries or is this Normal?**

- **8H⁺ + Ca₁₀(PO₄)₆OH₂**
- Supersaturated conditions in oral fluids

- **6(HPO₄)²⁻ + 10Ca²⁺ + 2H₂O**
- Demineralization

- Remineralization

- Undermineralized conditions in oral fluids
Change in Mineral Content Over a 24 hour Period (hypothetical)

Detection Methods-Ideal Method
- Reproducible, Accurate
- Easy to use and learn (inexpensive)
- Useful on most tooth surfaces
- Must have an influence on treatment

Progress of Mineral Loss/Detection
Caries Progression Rate

- Sweden (10-11-year-olds)

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer ½ of Enamel</td>
<td>1 year</td>
<td>2 years</td>
</tr>
<tr>
<td>Inner ½ of Enamel</td>
<td>21 months</td>
<td>28 months</td>
</tr>
</tbody>
</table>

Shwartz et al. (1984)

White Spot (Non-Cavitated) Lesion:
It is a subsurface lesion

Fluorescence Example

Reflections obscuring image

White Spot
What Level Of Assessment Do We Need For Sealant Placement In Any Setting?

Dental caries is a disease, not a white spot nor a cavity. These are signs or consequences of the disease, and represent different stages of the disease.

Cavitated Lesion (Cavity):
✓ A caries lesion that has lost the outer surface (leading to a discontinuity in the surface)

Dental caries is a disease, not a white spot nor a cavity. These are signs or consequences of the disease, and represent different stages of the disease.

Second molar molar

Fontana M, Waller-Smith J, Doméjean S, Espelid I, Tveit AE, 2009
Wu D, Fontana M, Doméjean S, Espelid I, Tveit AE, 2010
Caries Lesions in Radiographs

How do we detect caries lesions?

Traditional Methods for Detection
- Visual
  - Tactile
  - Light
  - Drying
  - Magnification
  - Tooth separation
- Radiographs
To **Diagnose** implies not only finding a lesion (Detection), but, most importantly, to decide if it is active, progressing rapidly or slowly, or already arrested. Without this information a logical decision about treatment is impossible (Kidd, 2001)

**Visual Examination**

- Most widely used method, in dental offices, in clinical research and in epidemiological studies.
  - Quick, cheap and easy.
  - Should be performed on a dry, clean tooth, with good light, with a mirror.
  - Useful on all surfaces and on all types of caries.
  - The basis of most other detection, and most often compared to new methods.
  - Standard on occlusal, smooth surface and root caries.
  - Mostly dichotomous decisions: presence or absence.
  - Usually no quantification of lesions and therefore difficult to monitor lesions.

**Probing with Sharp Explorer…**

Traditional probing with a sharp explorer has come into question as the ultimate determinant of caries activity. The exclusive use of a “catch” by the sharp explorer to diagnose caries in pit and fissure sites should be discontinued and clinicians are being called upon to use “sharp eyes and a blunt explorer.” Also non-cavitated lesions can become cavitated simply through pressure from the explorer during the typical examination. Thus, penetration by a sharp explorer can actually cause cavitation in areas that are remineralizing or could be remineralized.

Treating caries as an infectious disease. JADA 125 (June): 2-S to 15-S (1995)

Ekstrand et al., 1987
Appropriate Ways to Use the Explorer

- Clean debris from fissures and interproximal spaces
- Gently confirm and assess cavitations (breaks in the continuity of the surface)
- Feel margins and defects
- Feel the hardness of root or dentin surface lesions
- Feel the texture (roughness) of white spot lesions

ICDAS-2
http://www.icdas.org

<table>
<thead>
<tr>
<th>Code</th>
<th>ICDAS</th>
<th>Histology</th>
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<tr>
<td>0</td>
<td>0</td>
<td>Sound surface</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Non-Cavitated Lesion</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Non-Cavitated Lesion</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Non-Cavitated Lesion</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Non-Cavitated Lesion</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Non-Cavitated Lesion</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Non-Cavitated Lesion</td>
</tr>
</tbody>
</table>
Sensitivity of Visual Examination

Occlusal surfaces:
Typically low sensitivity, ~ 0.30, and high specificity

<table>
<thead>
<tr>
<th>Detection method</th>
<th>Caries Present</th>
<th>Caries Not present</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=50</td>
<td>N=950</td>
<td>N=1000</td>
</tr>
<tr>
<td>True Positive</td>
<td>TP N=20</td>
<td>FN N=30</td>
<td>N=77</td>
</tr>
<tr>
<td>False Positive</td>
<td>FP N=57</td>
<td>True Negative</td>
<td>N=893</td>
</tr>
<tr>
<td>Overtreatment</td>
<td></td>
<td>Undertreatment</td>
<td></td>
</tr>
</tbody>
</table>

Sensitivity: 40%
Specificity: 94%

Alwas-Danowska et al., 2002

Role of Magnification

Is this a cavity?

Porous white spot lesions

The Effects of Magnification on Treatment of Occlusal Carious Lesions


University of Michigan School of Dentistry, Ann Arbor, MI.

- Under the conditions of this study, it is concluded that magnification up to 5.5x can affect treatment decisions for occlusal caries lesions, with variations between examiners.

(Study funded by an American Association for Dental Research Fellowship)
Hidden Caries or Mis-Diagnosis?

- When no lesion is detected by visual examination, but radiographic methods reveal a lesion into the dentin.
- Noted in several reports in the 1980's and 90's (changes in histopathology of disease, slower progression, increased use of fluoride). Most studies at that time (that report a criteria) use cavitation as a threshold for caries.
- Prevalence: Ranges from 3% to 50% of lesions only detected on radiographs, usually 8-15% in adolescent population (Ricketts et al, 1997)
- Hidden caries does not seem to be a major problem when the clinical caries diagnostic criteria include non-cavitated diagnoses (Machiulskiene et al, Caries Res 1999)

Hidden Caries:

Of the clinically ‘sound’ surfaces, between 26%-50% in 14-20 year olds showed a radiolucency in the radiograph (Weerheijm et al., 1992)

Should we use other methods to aid in the visual detection?

Note: Sound teeth included everything except those with dentine caries clearly present-cavitation
“decalcification at the entrance of a discolored fissure or a dim white aspect in enamel”: Sound

Radiographic Exam

- Presence of desmineralization….not ACTIVITY
- Sealants can arrest lesions. But the radiolucency will remain.
A New Way to “Look” at Dental Caries

Fluorescence methods
- Quantitative Light Induced Fluorescence (QLF)
- Infra-red Fluorescence (DIAGNOdent, and DIAGNOdent Pen)
- Fluorescence Spectrophotometer (e.g. Spectra)

Fluorescence and Heat (Cavity System)

Transillumination
- FOTI
- DiaLUX Probe 2300 L
- BIOTEC

Light Scattering
- Midwest Caries ID

Electrical Conductance-Resistance (ECR)
- CarieScan

Ultra-sonic Methods
- Infra-Red Camera
- Digital Radiography (DR)
- Multi-photon Imaging
- Spectral Analysis
- Tomography
- OCT
- µCT

Why new methods?

Goals:
- Detect lesions early
- More reliably than before
- Quantification

Transillumination
Fluorescence Methods

• Quantitative Light Induced Fluorescence (QLF) (uses 290-450 nm)
• Infra-red Fluorescence (DIAGNodent, and DIAGNodent Pen) (uses 655nm)
• Fluorescence Spectrophotometer (uses several wavelengths)

Intraoral camera, and the capability for lesion detection and quantification

Infra-red Laser Fluorescence DIAGNodent®

- DIAGNodent primarily gets a signal due to porphyrins in bacterial products, therefore, it is secondary to the caries process (Fontana et al., 2003; König et al., 2000)
Motion

Cross Section of Fissure Caries

Enamel

Dentin

Motion / Movement is important!

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Diagnodent®

- Sensitivity always higher (0.19-1)
- Specificity always lower (range 0.52-1)

“The increased likelihood of false positives compared with visual methods limits usefulness as a “stand alone” diagnostic tool” (Bader and Shugars, Syst Rev, 2004)

- Limitations
  - Stain in fissures (e.g., tea)
  - Calculus and plaque
  - Some dental materials, e.g. some sealants

- Not a good correlation between high score and depth of lesion (Nphassen et al, 2002; in vivo)

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Assessment of Methods to Measure Caries In Vivo under Sealants

Caries detection is achieved using the difference in reflective properties of healthy and decayed tooth structure. Healthy tooth structure is generally more translucent than a decalcified one.

**Light Reflection: Midwest Caries ID**

*OCCLUSAL CARIES DETECTION*

*INTERPROXIMAL CARIES DETECTION*

**Electrical Conduction and Resistance**

*AC Impedance Spectroscopy Technique*

CarieScan PRO

**Sensitivity of a Detection System**

<table>
<thead>
<tr>
<th>Detection method</th>
<th>Caries Present</th>
<th>Caries Not Present</th>
<th>No Caries</th>
<th>No Caries</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caries Present</td>
<td>True Positive N=46</td>
<td>False Positive (Overtreatment) N=133</td>
<td>N=950</td>
<td>N=950</td>
<td>N=1000</td>
</tr>
<tr>
<td>Caries Not present</td>
<td>False Negative (Undertreatment) N=4</td>
<td>True Negative N=817</td>
<td>N=50</td>
<td>N=50</td>
<td>N=100</td>
</tr>
<tr>
<td></td>
<td>Sensitivity: 92%</td>
<td>Specificity: 86%</td>
<td>Lussi et al., 2001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sensitivity: 92%
Dangers of New Technology…

ACTIVITY: How to assess over time?
- Increase in number of lesions in a certain time period (incidence, increment)
- Increase or change in certain lesions (size, etc.)

How to assess the caries lesion activity in one appointment?
- Relate to appearance of lesion (chalky white, rough, dull, high surface porosity)
- Relate to other patient factors (e.g., presence of plaque, closeness to gingival margin, presence of other lesions)

We do not have yet a way/tool to do this reliably in “real-time”

To Seal or Not to Seal?
The 16 year old patient has bad oral hygiene, inadequate fluoride intake, and frequent sugary/cooked starch snacks between meals.

Please rate your level of agreement with the following statement:
“This tooth should be sealed to prevent caries progression.” (In this scenario a sealant means the placement of a resin pit and fissure sealant on acid-etched enamel).

Can we judge when caries is in enamel?
Is the presence of cavitation a more practical sign of the need for operative intervention?
Findings of Systematic Reviews for Sealing Sound Surfaces

Strong evidence for sealant effectiveness for prevention of caries initiation on “sound” surfaces

• Effect of large magnitude
  • Preventive fractions of 60-70%
  • Caries reductions ranged from 86% at 12 months to 57% at 48-54 months
• Positive effect across included studies

Llodra, 1993; Rozier, 2001; Task Force on Community Preventive Services (2002); Ahovuo-Saloranta et al., 2004, 2008

What About Sealing Caries?

• The evidence is overwhelming that the vitality of the dental pulp is not endangered by placing of sealants over small pit and fissure lesions…AND the process of tooth decay is apparently arrested
  NIH Consensus Conference Statement, 1983
• The evidence for caries arrest supports its use
  NIH Consensus Conference Statement, 2001

• Handelman, 1991 review of radiographic and bacteriologic studies (several years of follow up) on the therapeutic use of sealants
  • Concluded that “caries is inhibited and may in fact regress under intact sealants” (Handelman et al. 1976; Handelman 1982; Mertz-Fairhurst et al., 1986, 1995).
  • Even with partially lost sealants no radiographic evidence of caries progression after 2 years (Handelman et al., 1986; Messer et al., 1997)
Heller et al. (1995) found in a 5 year longitudinal study in a fluoridated community that...

- initially sound surfaces did not benefit greatly from the application of sealants (caries rate: 13% if not sealed vs. 8% if sealed)
- there were clear benefits in sealing incipient caries (52% if not sealed vs. 11% if sealed)

[Incipient if dark staining; chalky appearance, or if explorer sticks, but no frank caries (cavitation). When in doubt used this classification]

The Effectiveness of Sealants in Managing Caries Lesions
Griffin et al., J Dent Res 2008

- No matter how studies were grouped (e.g., by material, by study duration) effect of sealants was strong and consistent
- Sealed non-cavitated lesions consistently had better outcomes than not sealed lesions
- % of sealed carious surfaces progressing was low
- Caries reduction was about 71%

Reduction in Bacteria Counts by Time since Sealant Placement
Oong et al., 2008

- The percentage reduction in mean bacteria counts ranged from 50.8% to 99.9% and appeared to increase as time since sealant placement increased
### Risk of Caries

**Lost of Sealant vs. Never Sealed**

<table>
<thead>
<tr>
<th>Time (years)</th>
<th># Studies</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Griffin et al., JADA, 2009

### How To Assess Teeth For Sealant Placement?

- Visual assessment is appropriate
- Teeth can be dried with cotton rolls, gauze or compressed air
- Explorer may be used to clean the fissures and “gently” confirm cavitation; do not use sharp explorer under force
- Magnification (2x–4x) can be used, but is not required due to insufficient evidence on its effect in assessing cavitation
- Radiographs are unnecessary, especially in programs targeting children in grades 2 – 3
- Insufficient evidence to recommend other technologies to determine presence or absence of cavitation

Fontana et al., 2010

### Instructions

- Four-handed sealant placement is associated with higher retention rates
- Sealant retention rates for teeth cleaned with a toothbrush are at least as high as for teeth cleaned with a handpiece

Griffin et al., JADA 2008

Kolavic Gray et al., JADA 2009
Table 1: Sealants in need of Repair by Baseline ICDAS

<table>
<thead>
<tr>
<th>Baseline</th>
<th>ICDAS</th>
<th>1-year</th>
<th>2-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4% (9/91)</td>
<td>10% (9/87)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>11% (4/36)</td>
<td>13% (5/38)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>16% (9/58)</td>
<td>32% (18/56)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>31% (5/16)</td>
<td>50% (7/14)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13% (2/16)</td>
<td>50% (7/14)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11% (24/217)</td>
<td>22% (46/209)</td>
<td></td>
</tr>
</tbody>
</table>

Evidence-based clinical recommendations for the use of pit-and-fissure sealants

A report of the American Dental Association Council on Scientific Affairs
Jean Beauchamp; Page W. Caufield; James J. Crall; Kevin Donly; Robert Feigal; Barbara Crouch; Amid Ismail; William Kohn; Mark Segall; Richard Simonon

Resin-Based Versus Glass Ionomer Cement

- 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 concerns about moisture control
Placement Techniques

- A compatible one-bottle bonding agent, which contains both an adhesive and a primer, may be used between the previously acid-etched enamel surface and the sealant material when, in the opinion of the dental professional, the bonding agent would enhance sealant retention in the clinical situation.

- Use of available self-etching bonding agents, which do not involve a separate etching step, is not recommended.

- Routine mechanical preparation of enamel before acid etching is not recommended.

- When possible, a four-handed technique should be used for placement of resin-based and glass ionomer sealants.

- The oral health care professional should monitor and reapply sealants as needed.

Sealants vs. Fluoride Varnish

(Hirir et al., 2010; Cochrane Database Systematic Reviews)

- There was some evidence on the superiority of pit and fissure sealants over fluoride varnish application in the prevention of occlusal caries lesions.

- However, current scarce data limit recommendations on whether to apply pit and fissure sealants or fluoride varnishes on occlusal surfaces.
Preventive Resin Restoration

- A restoration that maximizes the benefits of conservative, adhesive dentistry.
- Developed to overcome the problems associated with “extension for prevention”
- PRR: Restore ONLY the cavitated lesion and seal the rest of the fissure system.

Sealant vs. Infiltrant

Conclusions

- Sealants are one of the most effective, evidence-based strategies we have to prevent dental caries in at-risk surfaces AND to arrest existing caries lesions.
- They do not require patient compliance (other than for check-ups)
- Effectiveness depends on retention, and thus is greatly affected by technique!
- Use them!
Passive dissemination of information is generally ineffective
- Educational materials (e.g., clinical practice guidelines, audiovisual materials, publications)
- Didactic educational meetings (e.g., lectures)
  Bero et al., BMJ, 1998

Active training programs have to be developed (resources planned and allocated) to educate teachers/practitioners: case discussions, ground rounds, etc.

Thank you…