Disclosures

Speaker Michelle Wright, RDH is an employee of GC America.

GC America did not receive any financial support from NNOHA for this webinar. NNOHA did not receive any financial support from GC America for this webinar.
Objectives

1. Understand the rationale for sealants in the COVID-19 world.
2. Review the evidence base for applying sealants.
3. Present a technique for applying glass ionomer sealants with minimal aerosol generation.
NNOHA Receives 3-Year HRSA NTTAP Grant!

• 12 month QI Integration Collaborative
• 6 month Learning Community Collaboratives
  • Integration Behavioral & Oral Health (iBOH)
  • Teledentistry
  • UDS Sealants Measure Improvement
  • Workforce Recruitment & Retention
• Webinars, NNOHA conference, Best Practices, Publications
• 2020-21 funding for COVID T/TA
2019 UDS Data Due 02/15/2020
KEEP CALM
WE'LL REOPEN SOON
COVID and Dentistry Unknowns

• Individual and cumulative risk from general dental practice

• Individual and cumulative risk from Aerosol Generating Procedures

• % risk mitigation/reduction from engineering controls and work practices
Primary Care Mission and Strategies

Improving the health of the Nation’s underserved communities and vulnerable populations by assuring access to comprehensive, culturally competent, quality primary health care services.

Increase access to primary health care services
Modernize primary care infrastructure and delivery system
Improve health outcomes and health equity
Promote performance-driven, innovative organizations

Increase Value of Health Center Program

UDS Dental Sealant Measure
# National UDS Sealant Data

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>42.2%</td>
<td>48.7%</td>
<td>50.7%</td>
<td>52.8%</td>
<td>?</td>
</tr>
<tr>
<td>Denominator</td>
<td>285,799</td>
<td>275,690</td>
<td>266,511</td>
<td>269,241</td>
<td>?</td>
</tr>
</tbody>
</table>
Disruption

• Prioritize procedures that prevent caries & future AGPs

Sealants More Important than EVER!!!!

• Eliminate useless AGPs ie. rubber cup prophy

• AGP-less dentistry ie. SDF, glass ionomer
Polling!

Have you placed sealants in the last week?

• Yes, we never closed or did not reduce services
• Yes, since re-opening
• No, since re-opening
• No, we are not open yet
Evidence Base for Use of Dental Sealants: Resin or Glass Ionomer

Bill Maas, DDS, MPH, MS
Control of Dental Caries

Preclinical phase

Clinical phase

Disease initiation

Non-cavitated

Cavity

Cure

Invalidity

Death

Exposure

Early diagnosis

Late diagnosis

Disease control

Fejerskov, 2004
Watch or Seal?

Wait And Then Cavity Happens

OR

Applied sealant
When in Doubt? Seal or Restore?

- Even the smallest restorations required removal of much sound tooth tissue.
- Restorations do not make teeth stronger, and they markedly increase the likelihood that future restorations will be larger.
- Only the dentist can restore. They have nothing better to do?
Sealants are effective in preventing & arresting caries in primary & permanent molars, and could minimize the progression of non-cavitated occlusal carious lesions.

This was a STRONG recommendation, meaning that in most situations clinicians should follow the course of action suggested by the panel and only in a selected few circumstances may they need to deviate from it.
Summary of ADA & AAPD Recommendations

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Quality of the Evidence</th>
<th>Strength of Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The sealant guideline panel recommends the use of sealants compared to non-use in permanent molars with both sound occlusal surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Moderate</td>
<td>Strong</td>
</tr>
<tr>
<td>The sealant guideline panel suggests the use of sealants compared to fluoride varnishes in permanent molars with both occlusal sound surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Low</td>
<td>Conditional</td>
</tr>
<tr>
<td>The panel was unable to determine superiority of one type of sealant over another due to the very low quality of evidence for comparative studies. The panel recommends that any of the materials evaluated (e.g. resin-based sealants, resin-modified glass ionomer sealants, glass ionomer cements, and polyacid-modified resin sealants in no particular order) can be used for application in permanent molars with both occlusal sound surfaces and non-cavitated occlusal caries lesions in children and adolescents.</td>
<td>Very Low</td>
<td>Conditional</td>
</tr>
</tbody>
</table>

If 100 Children Do Not Receive Sealants

- 50 children will have caries
- 50 children will not have caries

76% REDUCTION IN CARIES

If 100 Children Do Receive Sealants

- 12 children will have caries
- 38 children will be caries free due to sealant application
- 50 children will not have caries
Systematic Reviews and Guidelines

• ADA Guidelines for Non-Restorative Treatment of Carious Lesions (JADA, Oct 2018)

• **ADA & AAPD Guidelines for Sealants** (JADA, Aug 2016)

• ADA & AAPD Systematic Review of RCTs (JADA Aug 2016)


  Also

• **CDC Guidelines for School-based Sealant Programs. JADA 2009; 140(11):1356-1365.**

• Techniques for assessing tooth surfaces in school-based sealant programs. JADA 2010;141(7):854-860.
Guideline to Arrest Caries on Permanent Teeth

Permanent teeth

- Coronal surface
  - Occlusal
    - Noncavitated
    - Cavitated
    - Sealants plus 5% NaF varnish or sealants alone
      - If not feasible
    - 5% NaF varnish or 1.23% APF gel or 0.2% NaF mouth rinse
    - 38% SDF solution
    - Lesions should be monitored periodically throughout the course of treatment.
  - Approximal
    - Noncavitated
    - Cavitated
    - - 5% NaF varnish or - Resin infiltration alone or - Resin infiltration plus 5% NaF varnish or - Sealants alone
    - 1.23% APF gel or 5% NaF varnish
    - 38% SDF solution
  - Facial or lingual
    - Noncavitated
    - Cavitated
    - Noncavitated and cavitated
    - 5,000 parts per million fluoride (1.1% NaF) toothpaste or gel
      - If not feasible

- Root surface

Oct 2018
Evidence-based Guideline on Non-restorative Treatments for Carious Lesions

Recommendations for the arrest or reversal of noncavitated or cavitated dental caries using non-restorative treatments

For the Patient: “Although some decay may require invasive drilling, in its early stages it may be addressed by less invasive means. In fact, there is a variety of minimally invasive interventions you and your dentist can use to tackle decay early.”
But fewer than 50% have sealants. Why?

A 2001 survey confirmed that one barrier to providing sealants is dentists’ concern about inadvertently sealing over caries.

28% of dental providers surveyed at a recent NNOHA Collaborative do NOT intentionally seal over decay.

What would be the consequences of sealing over decay?
Sealing noncavitated caries in permanent teeth is effective in reducing caries progression.

- 6 studies, including 4 RCTs conducted before 2007
- Sealing non-cavitated carious lesions prevented caries progression 71% compared to teeth with non-sealed lesions up to 5 years after sealant placement.
Research designed to address concerns about sealing over ACTIVE carious lesions

Sealant retention = 70% at 44 months. (If a study tooth progressed to ICDAS ≥ 5 or radiographically halfway or more through the dentin, the tooth was restored.)

Regardless of lesion severity, sealants were 100% effective at 12 mo and 98% effective over 44 mo in managing occlusal surfaces at ICDAS 0-4 (without frank cavitation).

--Fontana, JDR, 2014
Inadvertent Sealing of Tooth with Decay into Dentin

What if a DH seals a tooth that a dentist might have restored?
- Is the patient unlikely to ever see a dentist again for the next 10 years? If so, the outcome is unknown.
- For all others, there will be plenty of opportunities to arrest the caries in the rare likelihood that the sealant is not effective.
Because of limited evidence, panel was unable to make specific recommendations on the relative merits of one type of material over others.

Most studies show resin-based sealants have significantly higher retention than glass ionomer-based sealants.

Caries reduction? Similar over short term. (few studies, low quality)
Selecting Sealant Materials

• The guideline panel suggests that clinicians take into account the likelihood of experiencing lack of retention when choosing the sealant material most appropriate for a specific patient and clinical scenario.

• Predicated largely on ability to isolate and dry the tooth.

• If good isolation, resin is retained better.
  -Wright, JADA, 2016

If tooth is not full erupted or moisture control is not ideal, then Glass Ionomer is preferable.
  --Antonson, JADA, 2012..
Are We Asking the Right Question?

Validity of Sealant Retention as Surrogate for Caries Prevention – A Systematic Review

Steffen Mickenauntsch*, Veerasamy Yngopal
Systematic Review Initiative for Evidence-Based Minimum Intervention in Dentistry/Department of Community Dentistry, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

Abstract

Introduction/Aim: To appraise the clinical literature in determining whether loss of complete sealant retention as surrogate endpoint is directly associated with caries occurrence on sealed teeth as its clinical endpoint and to apply the appraisal evidence in testing the null-hypothesis that the retention/caries ratio between different types of sealant materials (resin and glass-ionomer cement) is not statistically significant (i.e., Prentice criterion for surrogate endpoint validity).

Methods: Databases searched PubMed/Medline, Directory of Open Access Journals, IndMed, Scielo. Systematic reviews were checked for suitable trials. The search terms “fissure seal” and “fissure fill” were used. Article selection criteria were: clinical trial reporting on the retention and caries occurrence of resin and/or glass-ionomer cement (GIC) fissures sealed permanent molar teeth; minimum 24 month follow-up period; systematic review or meta-analysis. Datasets and information were extracted from accepted trials. The principle outcome measure was the ratio of loss of complete retention to the risk of caries occurrence per sealant type (RDR). Risk of bias was assessed in trials and sensitivity analysis with regard to potential confounding factors conducted. The null-hypothesis was tested by graphical and statistical methods.

Results: The risk of loss of complete retention of sealant materials was associated with the risk of caries occurrence for resin but not for GIC based sealants. The difference between RDR values of the two sealant types was statistically significant (p<.005). The null-hypothesis was rejected.

Conclusions: The current clinical evidence suggests that complete retention of pit and fissure sealants may not be a valid surrogate endpoint for caries prevention as its clinical endpoint. Further research is required to corroborate the current results.

Glass ionomer cement and resin-based fissure sealants are equally effective in caries prevention


Sachin Seth, DDS

Systematic review conclusion. The evidence suggests that there is no difference in the caries-preventive effects of glass ionomer cement (GIC) and resin-based fissure sealants. Therefore, both materials appear to be equally suitable for clinical application as fissure sealant materials.

Critical summary assessment. The results of the systematic review of limited evidence showed that there is no difference between the use of GIC and resin-based fissure sealants on permanent teeth in the prevention of dental caries. The conclusion that both sealant materials are equally effective does not reflect the possible confounding effects of either the resin-based fissure sealant or the GIC fissure sealant used in a split-mouth design. Evidence quality rating. Limited.

reviewed qualitatively: Of the clinical trials, one was a parallel group randomized controlled trial with a parallel group design, and the seven others were split-mouth studies and regarded as quasi-randomized. Owing to differences in clinical and methodological heterogeneity, the reviewers rejected two studies. The six trials in the meta-analysis included the first molars of 673 children aged 6 to 11

- JADA, 2011
Many Sealants are Lost within 3-5 Years: What Happens to Molars with Lost Sealants?

- Less than 13% develop dentin caries lesions within 3 years after sealant loss (re-exposure).
- Teeth sealed with Composite Resin had 4 times as many lesions (13%) as those sealed with Glass Ionomer (4%).
- Electron scanning microscopy reveals GI in deep fissures even after sealant “lost”.

Caveats:
- Low to medium caries risk children
- High viscosity sealant (Fuji IX)
- Lower than expected resin retention
How Might Sealants Work even if Lost?

• Emerging molars - highly susceptible
  • Surface enamel not fully “mature” – capable of further mineralization
  • Lack of occlusal contact enables plaque retention on occlusal surface
  • 6-7 year olds may not have strong toothbrushing habits

• Molars 3 years post-eruption – less susceptible
  • More highly mineralized enamel
  • Daily fluoride exposure (toothpaste & water/beverages) converts hydroxyapatite to fluorapatite wherever cariogenic plaque exists
  • 9-10 year olds may be more reliable & skilled toothbrushers

• Glass Ionomer
  • Micro-porosity of GI may allow enamel to mature (↑mineralization)
  • Fluoride diffuses from GI onto enamel (and dentin)
  • GI material may be retained deep in fissures
  • Any bacteria deep in the fissure are isolated from substrate needed to produce acid
Is it the Material or the Technique?

- Inferiority claims against HVGIC in comparison to resin-based sealants as current gold-standard are not supported by the clinical evidence.
- The clinical evidence suggests similar caries-preventive efficacy of HVGIC and resin-based sealants after a period of 48 months in permanent molar teeth, but remains challenged by high bias risk.
- Perhaps low-viscosity vs high-viscosity is not the issue at all, rather the use of “press finger” technique to press material into pits and fissures with a petroleum-jelly coated index finger.
Conclusion

• Both, glass ionomer and resin based sealants exhibit significant caries preventive effects.
• There is no evidence that either material is superior to the other in the prevention of dental caries.
• Therefore, both materials appear to be equally suitable for clinical application as fissure sealant materials.
• But, in the COVID-19 era the ease of use of GI and lack of aerosol generation suggests it may be superior, if not for the individual patient, then for the community - by enabling more patients to be seen at lower cost and least risk to staff.
Treatment Options for Sealants & Protective Restorations

An effective way to treat and protect caries-prone molars!

GC Fuji TRIAGE
Glass Ionomer Sealant
Surface Protection Material

Available in: White and Pink
Modified Hygiene Techniques In a COVID-19 World

**Eliminating Aerosol Sprays**

What does this look like? Examples of modification:

• Utilizing hand instruments vs. sonic/ultrasonic instruments
• Modified plaque & stain removal vs. full-mouth coronal polishing
• NO (minimal) use of air-polishing
• NO (minimal) use of air-water syringe
• Utilizing hydrophilic sealant material placement

Adjusting to Our New Normal
So Here is What We Know... **The Facts**

*According to JADA article, 143(2): February 2012...*

1. The occlusal surface of molars is responsible for **67 to 90** percent of caries in children from 5 to 17 years of age.

2. Partially erupted molars present a particularly difficult situation.

3. As long as an erupting tooth has no antagonist contact, plaque accumulation and caries development are promoted.

4. The eruption time for the first and second molars is about **1.5 years**... *(Length of time these teeth go unprotected!)*
And here is what we see... **The Reality**

1. ...the operculum covering the distal one-half of these teeth during the eruption process allows for the retention of plaque and the initiation of the carious process before complete eruption has occurred.

2. The location of the permanent molars in the posterior region of the child’s mouth also complicates his or her ability to properly clean these areas and remove debris.

3. “Unsealed occlusal surfaces with early enamel lesions have 4 times the chance of developing dentinal lesions according to one study.

" Evans, H.F. Partially Erupted Teeth: Seal...or Wait and Hope? Dentistry Today. Feb. 2006, p. 102-104. And here is what we see..."
Fuji Triage for Partially Erupted Molars

• Almost every young patient 6-18 years of age will have a partially erupted molar in some stage of development.

• Indications are that up to 50% of every partially erupted molar exhibits signs of an incipient lesion – deep pits and fissures and hypomineralized areas are very common.

• Literature shows that patients between the ages of 6-8 are the most susceptible to developing decay in the first molars.

• Second and even third molars (patients 12 - 18 years of age) present continuing treatment options.
WHY CHOOSE A GLASS IONOMER SEALANT
Instead of a RESIN SEALANT?

Dimensions of Dental Hygiene – October 2011
PROMOTE REMINERALIZATION Article

“A glass ionomer sealant encourages remineralization and maturation of the underlying enamel.

Once a resin sealant is applied to the lesion, however, the protected tooth surface can no longer be remineralized.

The protective resin film inhibits the ion-exchange with saliva and biofilm fluids in both directions—not only shielding the enamel from bacterial acid challenge, but concurrently barring the potential for remineralization.”
Features/Benefits GI

- **Hydrophilic** - Works in a wet field, moisture tolerant, needs moisture to bond
- **Ease of Use** – No Etch, Not Technique Sensitive
- **Self Cure** (2 ½ min)
- Apply on **ALL molars-even partially erupted molars**
- **Exceptional fluoride release**, 6 X more F than any other sealant
- **Re-Chargeable fluoride**, promotes building of fluorapatite
- **Chemically bonds** to enamel/dentin preventing micro-leakage (even if it’s not visible, GI remains in pits/fissures for caries prevention)
- **Keeps bacteria out**, allows Ca, PO4 & F to penetrate/maturate tooth
- No need to adjust occlusion GI will **wear into occlusion**
- **Low viscosity**
- **Cost & Time Effective** (4+ sealants –less than 5 minutes) **IDEAL SEALANTS!**
Vs. Resin Materials

- Moisture Sensitive
- No Chemical Adhesion
- Potential Shrinkage
- Possible Microleakage
- Marginal Discolouration
- Bacterial Penetration
What is a Glass Ionomer?

• Calcium fluoro alumino silicate glass... or
• Strontium fluoro alumino silicate glass in NEW GI’s
• Water Soluble Polyacrylic acid

Self-cured material creating an Acid-Base Reaction (chemical reaction) & Releases Fluoride for relatively long periods
Glass Ionomer & Dentin
A Glass Ionomer Surface Protectant

Cumulative Fluoride Release

Exceptionally High Rechargeable Fluoride Release

Source: GCC R&D
What About Retention?

After 3 years Post-Op

Cross Section of Extracted Tooth
**Fuji Triage Technique In a COVID-19 World**

1. **Identify teeth to be sealed partially/fully erupted**

2. **Apply GC Cavity Conditioner, 10 sec. with microtip brush. Use very wet cotton roll (pressing down into grooves) to remove the cavity conditioner**

3. **Clean plaque from occlusal surfaces with a wet cotton roll**

4. **Set into mixer, Mix 10 sec., high speed (approximately 4,000 RPM), 8 sec. for longer working time**

5. **Extrude GI onto tooth with applier. Press into occlusal surface with wet finger**

6. **Let set 1-2 min. Patient is ready to go.**

7. **Tap capsule on hard surface, Tap, Activate, Mix**

8. **Place capsule into capsule applier. Prime (click 2x)**

Photos courtesy of Rochelle G. Lindemeyer, DMD
Mistakes Clinicians Make

1. Over dry the teeth
2. Acid Etch the teeth

Removal of the Smear Layer is important for ensuring strong adhesion. **DO NOT** Acid Etch—**It WILL** pull moisture out of the tooth.
Cavity Conditioner vs. Acid Etching

Poly Acrylic Acid

10% PAA, 20 seconds

Phosphoric Acid Etched Dentin
• Exceptional fluoride release
• Creates a strong, acid-resistant layer, keeping bacteria at bay
• Calcium, phosphate & fluoride ions to strengthen teeth
• Moisture tolerant bonding, requires no etching

“Regarding recent inquiries about dental sealants, we confirm GC America’s dental glass ionomer sealants sold in the USA, Canada & Latin America do not contain Bis-GMA or Bis-Phenol A (BPA) as an ingredient.”
Indications for Use:

1. Sealant/Protective Restoration
2. Class V at Gingival Margin
3. Incipient Lesions (areas you would typically “watch”)

An Ounce of Prevention is Worth a Pound of Cure
- Benjamin Franklin -
Paradigm Shift

The Days of Only Doing Sealants on Fully Erupted, Non-Cavitated, Pedo Patients is No Longer the Standard of Care

Insanity: doing the same thing over and over again and expecting different results.

Albert Einstein

www.thequotes.in
Additional Resources:

Sealants Microsite
http://www.getsealants.com/resources.php

QUESTIONS?
Future Events

• Webinar: Rubber Dam Refresher for COVID-19
  • July 27, 2020 at 11am Mountain Time
  • https://attendee.gotowebinar.com/register/6395590166326567952

• Health Center School-Based Dental Programs and COVID-19: A Listening Session
  • August 10, 2020 at 11:30 am Mountain Time
  • https://attendee.gotowebinar.com/register/2291661915941139724
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