Her previous custom attention?
- 8 class 2 restorations in her mouth already
- Failing Sealants
- White spots throughout her lower dentition on the buccal surfaces
- Poor compliance per her parents
- Poor diet per her!
- Deep caries on upper bicuspids already!

3 Dental offices and traditional approach, 30 minute hygiene appointments... Restorative Visits...that's it...is that the care you want to provide?

Communication...
- The fact that she had plaque but no gingivitis...is she not a hygienist's concern?
  - Are you asking about diet, soft drinks, snacking?
  - Are you probing into how they eat, snack and consume their foods? So important to ask
  - Are you having them show you how they floss and brush and asking for how long? 8=2
  - Are you explaining their home care options in depth for them????

What are your options to customize your home care?
- In this case, she was not a snacker, but in fact drank soft drinks and one Propel every day at school
- Eats a lot of fruit at home
- Never flossed, though she said she did. Have your patients demonstrate and you will know!!
- Brushed only at night!

Step 1...Assessing the risk

The Caries Balance

Ideally our goals
Risk Based Approach
- More likely to develop dental caries
- Treat higher risk patients more aggressively

CAMBRA Clinical Study
- Confirmed the “Caries Balance” concept
- Fluoride alone cannot overcome high bacterial challenge
- Restorative tx does not reduce bacterial count in rest of oral cavity
- One or more frank lesions indicates high bacterial challenge and high risk for future decay
- Reducing caries risk by chemical therapy significantly reduced level of new caries

Risk Assessment Tools
- AAPD CAT
  www.aapd.org
- CRA
  www.cdafoundation.org
- ADA
  www.ada.org

Pathological Factors
- Caries lesions
- Recipient caries
- Enamel lesions

Disease Indicators
- White spots
- Restorations
- Enamel lesions
- Caries/dentin

Featherstone, Young, Wolff 2007

The Caries Imbalance
- Protective Factors
  - Protective Saliva
  - Protective Caries Resistance
- Pathological Factors
  - Caries lesions
  - Recipient caries
- Disease Indicators
  - White spots
  - Restorations
  - Enamel lesions
  - Caries/dentin
### Caries Risk Classification

**JADA Aug 2006**

**LOW RISK**
- No new or cavitated lesions during past 3 years
- No pathological factors that increase risk

**MOD RISK**
- 1-2 incipient or cavitated primary lesion
- Secondary lesions during past 3 years
- No primary or secondary lesion, but at least 1 pathological factor

**HIGH RISK**
- 3 or more primary or secondary lesion past 3 years
- Presence of multiple pathological factors

### Risk Based Approach

- More likely to develop dental caries
- Treat higher risk patients more aggressively

### Bacterial Culture Tests

- High count $> 10^5$ CFU/ml*
- Establish baseline levels of MS & LB
  - High risk patient
  - Mothers
  - New patients
- Monitor change

*Krasse 1988
*Andersson et al 1993

### Pathological Factors

- Mutans streptococci
  - Strep mutans
  - Strep sobrinus
- Lactobacilli species

### Protective Factors

- **High Risk Patients**
  - **0.12% chlorhexidine**
    - Reduces MS
    - 10 ml
    - 1 min
    - Bedtime
    - 1 week/month
    - Follow with 3 weeks of NaF rinse
10% povidone-iodine
- Reduces MS & LB in young children
- Professional application only
  - Swish
    - 10 ml / 1 min
  - Swab
    - 1-2 ml / 2 min

Xylitol
- Decreases levels of S mutans
  - 1 gram/stick
  - Adults
    - 6-10 grams/day
  - Older children
    - 4-5 grams/day

TheraGum
- Indicated for:
  - Patients with moderate to high risk for caries
  - Patients with xerostomia or
  - Patients who have high intake of sugar/starch diets.
  - Stimulates saliva flow to help strengthen teeth
  - May reduce the risk of caries
  - Promotes neutral pH
  - Aids in reducing plaque

Xylitol’s Action
A Schematic Illustration of a Streptococcus Mutans.
Xylitol is absorbed, not broken down, and then expelled from the Mutans Streptococcus and can be absorbed by other bacteria.

Pathological Factors
- Fermentable Carbohydrates
  - Demineralization Potential
    - Frequency of exposure
    - Retentive nature
    - Point of consumption
Soft Drink Consumption

Overall
- 56 gals/yr

Teen boys
- 81 gals/yr

Teen girls
- 61 gals/yr

Enamel dissolution

5.5

6.3

pH of saliva

<table>
<thead>
<tr>
<th>pH and Sugar Content of a Variety of Soft Drinks and Other Popular Beverages.</th>
<th>Sugar (grams)</th>
<th>Sugar</th>
<th>pH</th>
<th>Enamel dissolution</th>
<th>Enamel dissolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverage</td>
<td>Regular</td>
<td>Diet</td>
<td>Regular</td>
<td>Diet</td>
<td>Regular</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>3.22</td>
<td>2.34</td>
<td>3.32</td>
<td>3.24</td>
<td>3.22</td>
</tr>
<tr>
<td>Sprite</td>
<td>3.40</td>
<td>2.96</td>
<td>3.40</td>
<td>2.96</td>
<td>3.40</td>
</tr>
<tr>
<td>Fanta</td>
<td>2.92</td>
<td>2.77</td>
<td>2.92</td>
<td>2.77</td>
<td>2.92</td>
</tr>
<tr>
<td>Orange Juice</td>
<td>3.45</td>
<td>2.64</td>
<td>3.45</td>
<td>2.64</td>
<td>3.45</td>
</tr>
<tr>
<td>Mountain Dew</td>
<td>4.61</td>
<td>4.50</td>
<td>4.61</td>
<td>4.50</td>
<td>4.61</td>
</tr>
</tbody>
</table>
| 12 oz serving 1 tsp = 4.2 gm

Erickson et al 2001

Back to our Teenager...She had no clue about what she was drinking far more.

Recommend eliminating Propel out of her daily regimen

- If she does continue, tell us...
- Rinse your mouth out afterwards, trying to increase the pH and get it closer to neutrality
- She likes gum, so switch her to TheraGum or another pure Xylitol gum...which will help occupy Strep mutans and inhibit decay
Why the cavities? pH changes?
- Does she have diminished buffering capacities? Saliva Test by GCA can determine such.
- Does she have excessive Strep Mutans? Strep Mutan Test can determine such by GCA. In her case both were negative.
- ATP testing by Caries Free System.

Protective Factors

Saliva
- Flashes carbohydrates
- Buffers to neutralize acids
- Provides proteins & lipids
  - Protective pellicle
  - Supersaturation of Ca & PO
  - Antibacterial
- Carries fluoride

Saliva Tests
- Quality
- Quantity

Saliva-Check BUFFER Kit

Mechanisms of Action
- Inhibits bacterial metabolism
- Inhibits demineralization
- Enhances remineralization

Protective Factors

Fluoride

Calcium Phosphate Technologies

REMINERALIZATION

Protective Factors

F, Ca, PO2

Image courtesy of www.ineedce.com
ADA Foundation ACP
- Amorphous Calcium Phosphate
- Highly soluble / low substantivity
- Not bioavailable after product is rinsed
- Marketed to restore surface enamel luster

CPP-ACP
- Casein phosphopeptides* + ACP
- Binds & stabilizes ACP
- Releases ACP during acid attack

How to apply MI Paste?

The MI Paste Technique at night

For patients....when is the best time to floss?

After Brushing and after you place....
NovaMin®

- Amplifies the natural protective and repair mechanisms of saliva
- Comprised of calcium, sodium, phosphorus, and silicon
  - Calcium, sodium and phosphorus are natural elements found in the tooth
- Identified chemically as Calcium Sodium Phosphosilicate
- Three step process leads to the formation of hydroxyapatite-like crystals

**How NovaMin® works**

NovaMin® reacts with saliva allowing sodium ions to exchange with hydrogen ions, raising pH

At this elevated pH, calcium and phosphate precipitate as calcium-phosphate

Calcium phosphate crystallizes to build a new hydroxyapatite-like layer over exposed dentin and within the dentinal tubules


---

**Sensodyne® NUPRO® 5,000 ppm Sodium Fluoride Toothpaste**

Remineralization is achieved when healthy saliva (charged with fluoride, calcium and phosphate ions) deposits a hydroxyapatite-like layer on portions of the tooth

**Turning Her Around**

This is why you have an hour...to communicate and help your patients, at any age and it’s not just about probings!

**The 60 minute Value Appointment**

- Build Relationship
- Establish Credibility
- Clinical Screenings
- Share Findings
- Dr. Exam
- Oral Hygiene
- Instrumentation
- Create Value
- Hand-Off
- Off Break Down
Her Home Care:

- Brushing with Oral B Brush for 2 minutes and either before breakfast and or waiting 15 minutes after breakfast
- Rinsing with water after meals, and or drinking water with her meals
- TheraGum or Mints or another Xylitol product immediately after a meal
- MI paste 2-3 times per day or hi fluoride toothpaste such as Nupro Solutions and then flossing as this too will re-mineralize

Show them if they can’t!

If they can’t

So the next question is...Can an explorer really detect decay?

My Approach

A 24 year old dental rep comes into our office with a restoration free mouth and followed by her hometown dentist since she was 6

Another View

Hmmm…is there decay down there?

That doctor can’t see us, and OMG, he is just using an explorer!!!!

X-rays….too often unclear!

LODGICON

What are we ignoring?

Diagnosis of Dental Caries

Dentin involvement can occur under an intact enamel layer (Pitts, 1997)
Visual diagnosis can be highly subjective and is inferior to bite wings (Kelley and Holt 1993)
On X-ray, detecting occlusal decay is only when there is dentin penetration by 2-3mm due to the thickness of the X-ray having to penetrate buccal/lingually the thickest portion of the tooth.
Inter-proximal X-rays pass through a narrower part of the tooth and thus can diagnose earlier.

Radiograph Limitations

- 40-60% demineralization required to produce image
- Underestimates size or depth
- Insufficient to determine activity level
- Low sensitivity
  - 39% occlusal
  - 50% interproximal

Bader et al 2001

Digital Radiography

- Comparable diagnostic accuracy
- May offer small gains in sensitivity
  - Contrast adjustment
  - Digital subtraction
  - Caries detection software
- Paralleling preferred
Comparison of Explorers

Explorer Concerns

- Transference of infective S. mutans to other sites?
  - Loesche et al., J Dent Res 1979
  - Hujoel et al., Caries Res 1995

- 62% sensitivity / low reliability
  - Lussi, Caries Res 1991

- False positives & false negatives

- Disrupts intact surface layer, eliminating potential for reversal

What we use today

Let’s talk Inspection...

('% of time a technology finds a lesion that is actually there)
**Diagnostic Light feature**

Imagine how much more the hygienist can see!

**Explorers**

- Al-Sehaibany showed tug back by an explorer was only 24% diagnostic, meaning that 76% of the time that tug back was present, there was no caries!
- Ekstrand showed that a sharp explorer tip can damage an early de-mineralized white spot lesion of the enamel by cavitating the surface.

**An instrument I couldn’t imagine being without...Step 1 verifying**

**Conventional Detection Method**

- If surface caries, the explorer sticks and yet shown not necessarily diagnostic
- If no stick, assumption is no carious lesion
- But what about what the Doctor and/or Hygienist doesn’t see?

**Diagnodent Changes the Way We Detect Caries**

- Scans below the surface
- Basically a “Three Dimensional Explorer”

**The principle of fluorescent iridescence**

- A tooth surface fluoresces when irradiated by a light of a given wavelength
- This fluorescence changes according to the optical characteristics of tooth tissue, associated with bacteria. The value of this change may then give an indication of the extent of the disease process i.e. Decay and/or demineralized tooth.
Diagnodent usage
- Clean and dry the teeth prior to examination
- External stains or plaque will lead to false positives
- The tip is gently placed in contact with the tooth in order to enable the incident LASER beam to penetrate the surface and subsurface enamel
- The accuracy of the measurements may be increased by moving the tip in a slightly pendulous manner - rotating and pivoting it in all three dimensions

DIAGNOdent digital display
- "MOMENT" display gives the current real-time value being measured as it continuously changes from second to second
- "PEAK" display gives the maximum value recorded during any single tooth measurement

What do the values mean?
- Research has shown that it is possible to correlate values with disease progression (Lussi et al, 1998; Longbottom et al, 1998; Reich et al, 1998).
- From this work it would appear that:
  - values between 0 and 10 correlate with sound enamel
  - values between 10 and 20 correlate with outer enamel caries
  - values between 20 and 30 correlate with lower enamel caries
  - values over 30 correlate with dentinal caries

Explaining Why!
- Caries
  - 70% of overall adolescents experience tooth decay, and far more in lower income families
  - 90% of caries in pit and fissures, and most are in molars
  - Sealants reduce caries by as much as 60% from 2-5 years after placement
  - Pit and fissures account for 12.5% of the surface area of a tooth and yet this is where 88% of caries occur

Caries
- The overall annual attack rate for caries for all occlusal first permanent molar surfaces is 5.9% per year, while the approximal surfaces is 1.3% in a representative group of children, seven to fifteen years of age.
Equia

Conservative Preparation
Original Fissurotomy
- Overall head length allows for full cutting to the DEJ
- Small tip can conservatively explore fissure system
- Back diameter of cutting head designed to accommodate all popular explorers.
- Diverging axial walls, ideal for composites

Narrow Tapered Fissurotomy
NTF
- Approximately 1/6th the intercuspal width at full depth maximizes explorer access and visibility.
- Depth gauge provided by clear visibility head/neck interface

Shallow Taper Fissurotomy
- Approximately 1/11th the intercuspal width at full depth ideally suited for primary teeth, adult premolars, enameloplasty and for improved sealant retention.

The Technique
- Class 1’s
- Into Dentin
- Without major occlusal function

Do you just watch these?
20 Seconds of a Dentin Conditioner or even 5-10 seconds of Phosphoric Etch...

Activation

Injection of Fuji 9 Extra

After Waiting 3 minutes, trim and polish with 30 flute carbide or fine and ultra fine diamonds

Placement of G Coat to seal

Final
Patient with high DMF, poor diet, not very compliant with OH, conservative entry and in areas, caries removal...modified sealant approach?

Treatment
Conditioner
Good old usage of Ziplock

Activation

Final with G Coat Plus
Esthetic and Very long lasting
Minimal depth...

Glass Ionomer sealants 25 years out.
I Placed in 1984

Options: For Flowables
- Surefill SDR (not universal)
- Venus Flow (not bulk fill)
- Voco’s new flowable (highly filled)
- Shofu’s Low Flow Plus
- G Aneal
Too many times I find these failing sealants and the question is why?

Multiple Reasons

Fissures
- Nagano described 3 types: I, V and U
- They are all very difficult to clean

Sealants
- Sealant loss was up to 60% after 3 years in multiple studies, so retention is an issue
- A seven-year study by Mertz-Fairhurst and co-workers reported 86% complete sealant retention and 14% partial retention. Sealant loss was 21% while there was a 55% reduction in caries rate for the sealed teeth versus the unsealed teeth
- Partially lost sealants on a tooth do not make a tooth more susceptible via numerous studies
- Premolars last the longest, followed by maxillary teeth...Mandibular molars have the lowest retention

Reasons for failures in sealants
- Decay already present within the fissures and into the dentin
- Retention
- Micro-leakage
- High filler content and or low flow of material

Pulpdent’s Embrace WETBOND PIT and Fissure Sealant System

Embrace: The Technology is unique
- Routinely composite type sealants or flowables are HYDROPHOBIC: They don’t like water
- Bonding agent systems are routinely hydrophilic and then hydrophobic
- This product is Hydrophilic and Hydrophobic in one….water chasing so the objective is too bond to a moist surface
Embrace Wet Bond Sealant System

- Moisture tolerant
- Light cured
- Lightly filled
- Once cured easily seen to follow at recall visits

Retention

- Retention has been shown to be an issue with sealants
- If occlusion is heavy in the area and there is NO room for a sealant and yet the fissure is HIGH RISK, Strassler’s findings have found minimum conservative preparation will enhance long term surviv-ability

Pre-placement for wet-bonding

- Non-fluoride pumice paste
- Air Abrasion
- Rinsed and Air dried
- 15 second phosphoric etch
- Rinse for 10 seconds
- Either lightly air dry (no frost) or place cotton roll onto surfaces to remove excess or surgical suction at a 3-5mm distance

Embrace Sealant System

SEM shows Embrace Pit & Fissure Sealant without bonding agent. Excellent adaptation of sealant to the tooth and smooth margin.

SEM shows traditional fissure sealant. Large gap between the sealant and the tooth.

From Another Study listed Previously

SEM of EMBRACE Pit and Fissure Sealant shows marginal adaptation. This seals against microleakage and prevents caries.

SEM of traditional pit and fissure sealant shows poor marginal adaptation, which will result in microleakage and caries.

It’s as simple as

- A 15 second etch and rinse
- Light air or suction dry
- Leave mildly moist!
EMBRACE Seals Against Microleakage

Embrace performed exceptionally in marginal leakage testing, without using adhesives or bonding agents.1,2,3


Questions from Parents:
Bisphenol A (BPA)

- Dental sealants are routinely applied to children’s teeth to help prevent cavities. While almost all resin-based sealants contain derivatives of bisphenol A (BPA), a controversial chemical that has been linked to health risks, not present in this sealant: Embrace WetBond Pit & Fissure Sealant
- Research with laboratory animals has linked BPA exposure to heart health issues, and increased risk for cancer and diabetes, and hyperactivity

A new patient....
What’s your protocol?
What’s the flow like in your office?
What’s the protocol on the initial phone call?
Diagnodent...Guru, Velscope, Digital X-rays, Transillumination
What else do you offer?

Our new patient....
- 28 year old graduate student
- NO major issues
- Wanted a routine exam
- WHAT IS ROUTINE?
- An explorer, maybe a probe and ?????

The initial screening gives us an excellent idea of what to expect... routine... or not!
We work with Sesami on line and are currently developing a social media strategy.
Our office

- Review dental and medical issues
- Dental history is key as it relates to TMJ, Occlusion, Periodontics, Oral Surgery, Esthetics, Sensitivity Issues, Family History all lead to discussion points
- Standard in our office: Digital x-rays, Digital Pan if necessary, Velscope, Diagnodent if applicable, Full mouth probing and periodontal exam, Transillumination exam, Guru explanations, photos, and often enough models...less than an hour...rarely!

Some of her photos

Early abfractions/erosion: how does this affect brushing, times of brushing, treatments

More photos

- Any balancing Interferences? Fremitus? Mobility?
- Any history of ortho?
- Abnormal wear throughout Especially anterior teeth