Uncommon Common Sense:
What YOU need to know NOW about Restorative Dentistry and Materials

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Let’s Rock!

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Things are not always as they APPEAR

It may be your PERSPECTIVE
It may be your PERSPECTIVE

Beautiful Flow 00
- Unique glass ionomer filler particles
- Releases fluoride and other ions
- Neutralizes pH-Antibacterial
- Good polishability
- Visibly blends in well

High Viscosity (Low Flow) Flowable Composite

You may never have THOUGHT about it

If we say it long enough we BELIEVE it

Let’s re-examine some of our IDEAS we think we know

Common sense is often UNCOMMON
Dentistry is Ever-Changing

How do you Choose?

Minimally Invasive Dentistry

Lifetime of tooth often determined by first dentist intervention

Conservative Tooth Preparation

How do you restore?

Low Viscosity Flowable Composite

G-aenial Universal Flo

- Homogeneous spherical particles
- Good wear resistance
- High flexural strength (167 MPa)
- Filled 50% by volume
- Good polishability
- Blends in well

High Viscosity Flowable Composite

Conventional Nano-hybrid
CALSET
Thermal Assisted Light Polymerization

Completed Tooth Restorations
Low Viscosity Flowable Composite & Warmed Composite

Minimally Invasive Dentistry
15 Year Old

Minimally Invasive Dentistry
70% RED Proportion

Multiple Step Layering Techniques
Add translucent incisal hybrid or microfill

Add General Purpose Shade
• Aura MC 3
• TPH Spectra

Add dentin shade
• Aura Dentin 6
• Miris
Add Characterization

Add Facial Surface

- Aura Enamel
- Importante Junction
- Grandal GT
- must be invisible
- Beautiful II
- Esthelite Sigma Quick

Finish and polish restoration
- Restore adjacent tooth
- Shape, finish and polish restorations

Restore opposite teeth

Pre-Operative

Finished Restorations

Bonding Challenges

♦ Post-Operative Sensitivity

Hydrodynamic Theory

Fluid flow within dentinal tubules causes PAIN


Hydrodynamic Theory

Opened, unsealed dentinal tubules causes PAIN
**Total Etch Technique**

Placement of Etchant

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**Rinsing of Etchant**

"Moist" Dentin

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**Placement of Resin Primer**

Apply multiple coats

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**“Overwet” Phenomenon**


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**Overdrying**

Collapsed collagen fibrils


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**Proper Moisture**
**Moisture Variability**

Evaporating the solvent with dry air

**Self-Etching Primer**

Self-Etching" Primer Acidifying Primer accompanies etch

Resin Tags do not Contribute to Dentin Adhesion in SE Adhesion

Self-Etch Technique

Challenges

- Decreased bond strength to un-etched enamel
- Marginal gap formation with un-etched enamel
- Bond incompatibility to self-cure and dual-cure resins
- More susceptible to hydrolytic degradation resulting in significantly diminished bond strengths over time
Self etching Primer

**Effect of Enamel Etching-Marginal Gaps**

Solution: “Etching prepared enamel w/ phosphoric acid promoted better marginal integrity with self-etching bonding agents.”


**Long Term Dentin Bond Stability**

**MMP-Matrix Metalloproteases**

- MMPs are naturally occurring proteases involved in dentin formation and trapped during odontogenesis
- Not bacteria but proteolytic enzymes found within dentin capable of degrading collagen within newly created adhesive hybrid layers
- Low pH causes dentin to release these inherent MMPs which attack exposed collagen fibrils


**MMP-Matrix Metalloproteases**

In-vivo 12 m w/PBNT (Acetone)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Immediate (MPa)</th>
<th>14 mo (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>23.3 (9.2)</td>
<td>19.0 (5.2)</td>
</tr>
<tr>
<td>CHX</td>
<td>32.7 (7.6)</td>
<td>32.2 (7.2)</td>
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</tbody>
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Carrillo et al., JDR 2007; 86; 529
Brackett et al. Operative Dentistry; 2009;34(4):381-385

**Potential MMP Inhibitors**

- Chlorhexidine (CHX)
- Benzalkonium Chloride
- MDPB (12-methacryloxydodecalpyridinium bromide)
  - GLUMA
  - Epigallocatechin-3-gallate (green tea polyphenol)


**Long Term Dentin Bond Stability**

**Disinfect to prevent MMPs**

- Use Etchant containing 1% Benzalkonium Chloride
  OR
  - TE-Apply 2% Chlorhexidine after acid etching for 30 sec
Long Term Dentin Bond Stability
Disinfect to prevent MMPs

MDPB (12-methacryloyldecalpyridinium bromide)


Selective Etch Technique
- Apply etch to enamel only for 15 seconds
- Wash thoroughly
- Place self-etching primer


Universal Bonding Agents
- Bond strength same to total vs self etch

![Graph showing Dentin Bond Strength](image)

Dentin Bond Strength
- Self-Etch
- Total Etch Moist
- Total Etch Wet

Universal Bonding Materials
- Total-etch, self-etch or selective-etch technique
- Can be used for direct and indirect restorations
- Bond to all indirect substrates-metal, ceramics, zirconia, porcelain and lithium disilicate.
- Compatible with light-cured, self-cured and dual-cured composite and luting cements.

![Image of Universal Bonding Materials](image)

Self-etch
- Selection-etch
- Total-etch

Total, Self or Selective Etch Universal Bonding Materials

Total, Self or Selective Etch All-Bond Universal
- Total-etch, self-etch or selective-etch
- Single bottle for direct and indirect restorations
- High bond strengths to metal, ceramics, zirconia, porcelain & lithium disilicate.
- Compatible with light-cured, self-cured and dual-cured composite and luting cements since pH is 3.2
- Becomes hydrophobic upon setting
**Total, Self or Selective Etch**

**MDP Universal Bonding Materials**
- Cross-linking of polymer chains
- Hydrophobic upon setting

**Bulk Fill Composites**
- Allow many posterior restorations to be built up in 1 segment
- Descriptions
  - “Stick the stuff in the hole and cure”
  - Evolutionary
  - Monolithic
- Physical Advantages
  - Deeper depth of cure
  - Less Polymerization Shrinkage
  - Less Polymerization Shrinkage Stress
  - Reduced likelihood of air voids between layers

**Bulk Fill Flowable Composites**
**Low Shrinkage Stress**
- Surefill SDR
- Voco Xtra
- Beautifill Bulk Flowable
- Venus Bulk Fill

**Surefill SDR**
- Reduced polymerization shrinkage stress
- Bulk fill to 4mm
- Increased sensitivity to light

**Bulk Fill Composites**
- Modes of Action
  - Improved initiators
  - Greater translucency allows better light transmission
  - Delayed gel state formation
  - Increased elasticity
- Materials
  - Flowable
  - Conventional
- Advantages
  - Quicker, easier
  - Less chance of enamel and cusp fractures
  - Increased likelihood of adequate resin polymerization

Polymerization Shrinkage Stress (MPa)

Bulk Fill Posterior Composites
Low Shrinkage Stress

- Voco Xtra Fill
- Beautifill Bulk Flow
- Aura Bulk Fill
- Tetric Evo-Ceram Bulk Fill
- Sonic Fill

ADVANTAGES
Sonic Energy Assisted Light Polymerization

- Improved flowability of composites
- Improved marginal adaptation
- 5mm depth of cure
- Increased sculptability and ease in shaping anatomy
- Composite designed specifically for use

Triodont or Palodent Plus
Multiple Medications

Oral Environment Challenges - Xerostomia

- Incidence increases with # of drugs taken
- 50% of patients taking 4 or more medications had Dry Mouth

“40% of all prescription drugs have dry mouth listed in the PDR as a possible side effect”


Oral Environment Challenges - Carbohydrates

Nutrition Facts: Serving Size: 8.3 fl. oz; calories 140; total fat 0g; sodium 220mg; potassium 60mg; total carbs 28g; sugars 28g

Nutrition Facts: 16 fl. oz; calories 140; total fat 0g; sodium 220mg; total carbs 28g; sugars 28g

Oral Environment Challenges - Bottled Water

- Fluoride-less water
- Fluoridated water

Oral Environment Challenges - Illegal Drugs

- “Meth mouth” or chronic marijuana use
**Need Therapeutic Restorations**

- Xerostomia patients
- High carbohydrate users
- Non-fluoridated water users
- Drug abusers

**Composite Challenges**

- Post-operative sensitivity
- Recurrent decay
- Achieving proper moisture
- Polymerization shrinkage
- Increased time-layering
- Technique sensitivity

**Glass Ionomer**

- Low post-op sensitivity
- Fluoride Release
- Moisture variability
- No shrinkage
- Bulk placement
- Simple-more forgiving

**Glass Ionomer Base/Restorative**

- Fuji IX Self Cure Glass Ionomer
- SDI Self Cure Glass Ionomer

**Glass Ionomer Characteristics**

- More highly filled-reduced wear
- Self-curing in 2.5-5 minutes
- No polymerization (setting) shrinkage stress
- Expansion/contraction similar to tooth
- High fluoride release
- Bioactive

**Glass Ionomer Uses**

- Multiple cervical carious lesions
- Pediatric Patients
- Sealants
- Class V restorations
- Sandwich Technique
- Crown buildups
- Long term interim restorations
- Cements

**Glass Ionomer Restorations**

- High caries rate individuals
Glass Ionomer Restorations

Remove decay and place matrices

Glass Ionomer Restorations

Treat dentin with PAA

Glass Ionomer Restorations

Place, shape and wait 2:30

Glass Ionomer Restorations

Shape with diamonds w/ water

Glass Ionomer Restorations

Dry and place Surface Sealant

Pediatric Patients

No phosphoric acid
Posterior Glass Ionomer

- Stronger Glass Ionomer
- For use in posterior teeth
- Increased compressive strength (219 MPa)
- Increased flexural strength
- Greater wear resistance
- Increased acid resistance
- High fluoride release maintained
- Stronger surface sealant
- Better designed for Class II posterior restorations

Sudden Onset Caries

- 47 year old female
- Been in the practice over 30 years
- Regular re-care appointments
- Significant changes in health history
- No restorations in 8 years
- Radiographs revealed multiple interproximal radiolucencies not present 12 months previous
- Required 16 restorations
- Need caries resistant restorations

Preparations

Preparations

Posterior GI Restorations
How long do they last?

- 8-12 years - single surface 65% 10 yr
- 5-8 years - multiple surface 35% 10 yr
- The larger the restoration, the shorter its lifetime

Long term interim restoration


Resin-Modified Glass Ionomer Characteristics

- Acid/base and polymerization reactions
- Dual cured - faster
- Shortens time needed to control moisture
- More esthetic and translucent
- Fluoride release
- Higher tensile, bond strength and wear

Resin-Modified Glass Ionomer Uses

- Liner or Base
- Class V Restorations
- Restoration Under Crown
- Temporary prior to crown
- Sandwich technique
- Cements

Resin-Modified Glass Ionomer Base/Restorative Capsule

- Fuji II LC
- RIVA LC

Resin-Modified Glass Ionomer Base/Restorative Paste-Paste

- Ketac Nano
- Fuji Filling LC

Resin-Modified Glass Ionomer

Gingival recession & root caries
- 2nd mode and contact
- Remove decay place retention
Gingival recession & root caries
- 1st molar and bicuspids
- Remove decay/place retention

Condition with PA
- Pre-treat with dentin conditioner (Polyacrylic acid)

Resin-Modified Glass Ionomer
Material Placed and Light Cured
- Place excess material
- Light Cure

Final Restorations
- Shape restorations
- Hold back gingiva and shape with fine diamond
- Etch with phosphoric acid, wash and dry
- Place surface sealant and light cure

Quick Temporary prior to Crown

Temporary placed 6 years ago

Sandwich Technique
Glass Ionomer
- Exposed to occlusion
- Able to control moisture
- Not acid etching
- No shrinkage stress
- Highest fluoride release

Resin-Modified Glass Ionomer
- Out of occlusion
- Need quickness
- Need to acid etch
- Need to bond
- ↑ translucence/esthetic

Endodontic Root Canal Therapy?
Perhaps not IF:
- Asymptomatic
- Single small exposure
- Able to achieve hemostasis

Traditional Pulpal Protection
Indirect Pulp Capping
Best not to expose pulp
- Asymptomatic
- Sound 2mm around margins
- Stop when next scoop will expose pulp
- Place GI or Ca(OH)₂

Traditional Pulpal Protection
Indirect/Direct Pulp Capping
What are we trying to accomplish?
- Mechanical Sealing of the Pulp
- Stimulate hydroxyapatite formation
- Dentin bridge formation

Traditional Pulpal Protection
Indirect/Direct Pulp Capping
How does this happen?
- Material sets hard and adheres to dentin
- Alkaline pH
- Release of Ca²⁺ ions

OH SH*T!
Unproven Pulpal Protection
Indirect/Direct Pulp Capping

Resin Dentin Bonding?
- Dentin Bonding Agent-Composite

“Contact with acid and pulp tissue started the bleeding process thus damaging the bonding technique resulting in no cellular differentiation and new dentin formation. The use of dentin bonding agents should be avoided for vital pulp therapy.”


Unproven Pulpal Protection
Indirect/Direct Pulp Capping
Glass Ionomer/RMGI?

“Poly Acrylic Acid (PAA) inhibits apatite formation in the body environment. PAA released from the glass-ionomer cements inhibits the apatite formation on tooth surfaces. It might be considered difficult to obtain bioactive glass-ionomer cements”


Improved Pulpal Protection
Indirect/Direct Pulp Capping

Ca(OH)₂ Paste
- Ultra-Blend Plus– Ultradent

Pulp Protection – Indirect/Direct Pulp Capping

MTA (Mineral Trioxide Aggregate)
- ProRoot-Dentsply
- Biodentine-Septodont
- Thera-Cal LC-Bisco

Tricalcium silicate \((\text{CaO})_3 \cdot \text{SiO}_2\)
Dicalcium silicate \((\text{CaO})_2 \cdot \text{SiO}_2\)
Tricalcium aluminate \((\text{CaO})_3 \cdot \text{Al}_2\text{O}_3\)
Tetracalcium aluminaferrite \((\text{CaO})_4 \cdot 2 \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3\)
Gypsum \(\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}\)
Bismuth oxide \(\text{Bi}_2\text{O}_3\)

Pulpal Protection – Indirect/Direct Pulp Capping

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Gypsum \(\text{CaSO}_4 \cdot 2 \text{H}_2\text{O}\)
Bismuth oxide \(\text{Bi}_2\text{O}_3\)
Biodentine
High concentration MTA (self setting)

Theracal
Resin Modified Calcium Silicate
Light cured apatite forming MTA in a unique hydrophilic resin (polyethylene glycol methacrylate) that releases calcium

Social Media Communication

Cell Phone Text Messaging
Appt Reminder/ Late Cancel

Custom Email Messaging
Appt Reminder/ Confirmation

Custom Email Messaging
Appt Reminder/ Confirmation

Appointments for: Wednesday, September 17, 2014
Rescheduling/ Reactivating Patients

Increase Production

Monthly Value

$61,365.00 brought in from patients who did not pre-appoint in 2016

Custom Email Newsletters

Regular Newsletters

Custom Email Messaging

Birthday Wishes

Custom Email Patient Surveys

Automated Post-Appointment

Custom Email Patient Surveys

Automated Post-Appointment

Christmas Promotions

Happy Whitening!!
Custom Email Patient Surveys

Automated Post-Appointment

Online Patient Reviews

Monitor Online Reviews

Online Patient Portal

Pay Bills Online

Management Research
Maps

Research Locale Demographics

New Mobile Apps

Increase internet marketing

Mobile Devices

Healthgrades

March 1, 2016
Healthgrades

Increase internet marketing

May 1, 2017

Limelight

Online Patient Scheduling

Complete Phone

Weave

Syncs digital phone with your practice management system to instantly show caller information on computer screen

- Looks like a phone app
- Go down checklist

- Ability to text message
- Ask patients for recommendations*

Complete Phone

Connects Phone to Practice Management Software
**Weave**

**Other Features**

- Phone Service: Connect your phones to your patient communication software.
- Reviews: See positive reviews from patients and address negative reviews before they are posted for others to see.
- Conversational Text Messaging: Texting works like a smart phone.
- Appointment Reminders and Recalls: Set automated, pre-made or personalized text reminders and recall messages.
- Mobile App: Easier for patients to communicate with your office.
- Reports: See stats on phone usage.

**Advantages**

- Ability to Maximize phone calls for scheduling and collections
- Messaging Capabilities
- Cost Savings
- Excellent Customer Service

**Challenges**

- Learning Curve
- Internet Reliability
- Weave Growing Pains

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**Thank You!**

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