Let’s Grow Tooth

Excellence with bioactive/regenerative materials

Let’s Grow Tooth:
1. Bioactive vs Regenerative
2. Direct restoratives
3. Indirect restorations
4. Cementation to heal margins
5. Regenerative Aesthetics

Let’s Grow Some Tooth...

Bioactive ([biˈoʊəkтив]) having an effect on or eliciting a response from living tissue.

Regenerative
To provide an environment that promotes dentin repair

Let’s Grow Some Tooth...

Optimal pH
Bacteria inhibition
Void free
Moisture tolerant
Bio-friendly
Well sealed
Tooth-like physicality

To provide an environment that promotes dentin repair

“regenerative” materials:

TheraCal LC (Bisco) — a dental
Activa (Pulpdent) — a base/restorative
CeramIR (Doxa) — a cement
Glomer (Shofu) — a class of restorative materials

Jack D Griffin Jr DMD
“A resin inomer that release and recharges calcium phosphate and fluoride…”
A bioactive resin matrix and bioactive glass filler.

TheraCal LC (Bisco)

What it is:
A Resin Modified Calcium Silicate (RMCS)
Stimulates apatite formation and 2G dentin
MTA (Mineral Trioxide Aggregate) chemistry
Early high alkalinity (High pH = 11)
Neutralizes over weeks
Self-sealing minor bond to dentin
Anti-microbial

Clinical use
Liner to protect pulp
Place on moist dentin prior to DBA
Keep 1 mm deep or less
Opportunity exists into deep caries
Direct pulp cap possible
Keep 1 mm from enamel
May show through less opaque composites

Giomerion release by S-PRG:
A stable glass ionomer which allows ion release and recharge.
The surface layer is protected giving great physical properties.
The glass core is protected from moisture.

margin
perfect
matrix

Remin Pro (Voco)
Fluoride
Hydroxyapatite
Xylitol

MI Paste (GC)
Fluoride
Ca phosphate
Xylitol

Enamelon
Fluoride Toothpaste
For sensitive, anti-caries, and tartar control
Brush 2X/Day
Tray 2X/Weekly

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Problems with posterior composites?
- Contacts
- Shrinkage
- Depth of cure
- Sensitivity
- Longevity
- Time

Best polishers
Disposables
Super Snap Single
One Gloss (Shofu)

Can’t afford to re-use burs
Microcopy

Caries indicator
Sable Seek
Ultradent

What’s the bond strength to decay?

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Regenerative Dentistry

A source of reparative ions
Alkaline environment
Promote dentin healing
Bacteriostatic
Dentin tubule sealant
Thermal insulation

NOTE: Polyacrylic acid of GI inhibits HA

Polyacrylic acid
Source of reparative ions
Alkaline environment
Bacteriostatic
Dentin tubule sealant
Thermal insulation

= apatite

Liner
Moist Dentin
Light cure
Etch
DBA
Restore

No direct pulp capping if...
Spontaneous pain
Throbbing
PA problem
Bleeding hard to control

Very tolerant
wet
dry
moist

Very versatile
etch
no etch
selective etch

"Universal" DBA’s:

Very good bond
enamel
dentin
ceramics
zirconia – metal
composite

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Regenerative Dentistry

Practice building 101...
Aging population
Recession
Abfraction
Repeatable success

Jack D. Griffin, Jr. DMD & Aseecc
606-938-6241

Eureka Smile Center
Cosmetic and Family Dentistry

Anesthetic?
Enamel
Bevel
Sand
Selective
Uni DBA
Gomer
Flowable

Advantages...
Decrease sensitivity
Non-invasive
Esthetic
Root seal
Predictable
Profitable

Isolation is critical

Dam
Isolite
DentalPop/DriTip
Cotton rolls
Gauze

Isolation is critical

Dam
Isolite
DentalPop/DriTip
Cotton rolls
Gauze

Micro Etcher
Prep Star
27 micron aluminum oxide
Darville Engineering

Enamel:
Bevel
Etch
DBA

Dentin:
Sand
DBA
Let’s Grow Tooth

Regenerative Dentistry

Matrix metalloproteinases (MMP’s) are enzymes that may break down the hybrid layer between dentin and resin.

Results From A 13 Year Recall Study
University of Florida – Published in JADA in 2014


41 of 61 restorations examined at 13 years. 19 of 26 Class I, and 22 of 35 restorations were observed.

- 27% failure at 13 years
- 52% scored as excellent
- 3.2% had secondary decay

“Where it matters most”
Margins
Dentin

Where our technique is most critical

Beautiful Bulk
Shofu
4mm depth
Somewhat clearish
Good color
Low shrinkage
Good strength
Easy to form contacts
Giomer bulk fill
Fluoride release

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Regenerative Dentistry

The splint

Activa:
Dual cure
15 second total etch
DBA optional
Decent color
Ion exchange
Calcium, phosphates, fluoride release
Re-chargeable

Does the LED light hurt your retina?

1. Half power
2. Look up often
3. Remove when not needed

Let’s Grow Tooth
Indirect restorations

Potentially
YES!

Lowering the stress:
Profitable practice
Reasonable pace
Quality work
Clinical success
Proper staffing

Cementation Sanity
The most durable aesthetic restorations EVER
(and how to stick ‘em in)

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Let’s Grow Tooth

Regenerative Dentistry

“Doc, that tooth never hurt until you FIXED it!”

New burs
Water
Isolation
Selective etch
Universal DBA
Air thin wall
Regenerative
Flowable 0.5mm cure
Dentin replacement
Max polymerization
Polish well

mon·o·lith·ic (mon-uh-lith-ik)
Adjective
NO layering porcelain!

What changed?
Emax changed everything.
Zirconia added security.
Better adhesion made it more efficient.

2015...most popular aesthetic restorations:
Lithium Disilicate (IPS e.max)
Porous Filled Silica Glass
300-400 MPa flexural strength
Adhesive cementation best
Strong enough to handle cementation
Traditional porcelain bonding

Zirconium Oxide (Bruxer, Leva...)
Polycrystalline metal type
1000 MPa flexural strength
No layers, so not esthetic
Cement or bond in place

Use the strongest material that meets the minimum cosmetic need of the patient.

PFM gold

Monolithic zirconia...

© Very durable
© Prep similar to gold
© CAD/CAM made
© Digital impression perfect for it
© Cement or Bond
© Fast turn around from lab
© Total PFM replacement?
© Inexpensive

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Monolithic zirconia...
- Treat as a metal
- Meets aesthetic demands of 80-90% of molar crowns
- Wear similar to enamel and less than feldspathic porcelain if polished well
- ADJUST: Fine diamond, concentric burs, light pressure, water, polish

Monolithic lithium disilicate...
- Very durable, versatile
- 1.5-2.0 mm clearance
- Monolithic aesthetics good for 95% of posterior restorations
- Cementation good if prepped well
- Adhesive cementation may result in higher ceramic strength
- Slightly better aesthetics than zirconia, more translucency

Cementation sanity
- Non-Adhesive GOOD
  1. Resin Modified GI most popular
     - RelyX Luting (3M ESPE)
     - Fuji Plus (GC)
     - Nexus RMGI (Kerr)
  2. Easy mix, easy clean up
  3. Low sensitivity
  4. Does not strengthen restoration
  5. Good if retentive prep

2. PRIME PLUS
- Single bottle
- Metal primer
- Sand blast
- Apply then air thin
- NO bonding on crown
- Highest bond to zirconia
- Works with dual cure, self cure, or light cure resin cements

Remove zirconia?

Bond
Cement
Material
Retention
Aesthetics
Let’s Grow Tooth

Regenerative Dentistry

Monoblock Lithium disilicate prep... prep between gold and PRM

Ivoclean
How effective is its performance?

Tensile Bond Strength in MPa after 24h

<table>
<thead>
<tr>
<th>Material</th>
<th>Bond Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium-Disilicate</td>
<td>47.5</td>
</tr>
<tr>
<td>Zirconium oxide</td>
<td>47.8</td>
</tr>
<tr>
<td>Water</td>
<td>21</td>
</tr>
<tr>
<td>Phosphoric acid</td>
<td>15.8</td>
</tr>
<tr>
<td>Ivoclean</td>
<td>49.8</td>
</tr>
<tr>
<td>Ivoclean, etched with HF</td>
<td>44.6</td>
</tr>
</tbody>
</table>

Source: R&D Ivoclar Vivadent AG, Schaan, Liechtenstein, 2011

Ivoclean
How effective is its performance?

Zirconia:

Good prep: Anything is good
Cements – Ceramic, RMGI
Self Adhesive – BeautiCem, SpeedCem
Adhesive – DuoLinkU/ABU

Less than ideal prep: Need adhesion
Zirconia primer – Z Prime Plus
Self Adhesive – BeautiCem, SpeedCem
Adhesive – DuoLinkU/ABU

Lithium Disilicate:

Good prep: Anything is good
High esthetics
Cements – Ceramic, RMGI
Self Adhesive – BeautiCem, SpeedCem
Adhesive – DuoLinkU/ABU

Less than ideal prep: Need adhesion
Self Adhesive – BeautiCem, SpeedCem
Adhesive – DuoLinkU/ABU

Cementation sanity

The stress of dentistry

Sad...
6 in 10 would not do dentistry again

1. To much stress for $ 
2. Dislike insurance 
3. Awful at business 
4. Tedious 
5. Hate patients

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Help!

1. Find a niche you enjoy (Implants, ortho…)
2. Be involved (AGD, ADA…)
3. Work towards something (AACD, MAGD…)
4. Learn always (study groups, continuums…)
5. Get in shape (p90X, Insanity, yoga…)

Implant Crowns

Restoration success
Bio-friendly cements
Thorough clean up
Good retention
Soft tissue tolerance

Anutra
Lidocaine
Buffered
Less discomfort
Intense
Block in 4-5 minutes

Sable Seek Ultradent
Caries indicator

Air abrasion
Frosted
Supra G

SolutionReach
Practice Management Software

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Let’s Grow Tooth

Regenerative Dentistry

Monolithic Bridges

E.Max
Anterior only
3 unit max
3mmX3mm connectors

Zirconia
Esthetics the limit
Length no matter
3mmX3mm connectors

Goals
Durable
Esthetic
Comfortable

Pumice
2% Chlx

Lowering the stress:
Profitable practice
Reasonable pace
Quality work
Clinical success
Proper staffing

Panasil
Futar
Kettenbach

Wear
Rehabilitation
Zirconia
E.max

Positive proof of global warming.
Change in
dental
thinking...
1. No layering porcelain
2. Digitally made
3. No model
4. Less expensive
5. More durable
6. Cementation to promote dentin bonding
Let's Grow Tooth

Remove temps
Pumice
2% chlx –Cavity Cleanser
ViscoStat Clear

The porcelain:
ViscoStat Clear
Try in
Rinse
Ivoclean
Rinse
Silane

3 pillars of occlusion:
Simultaneous centric
Anterior disclusion
Cuspid rise