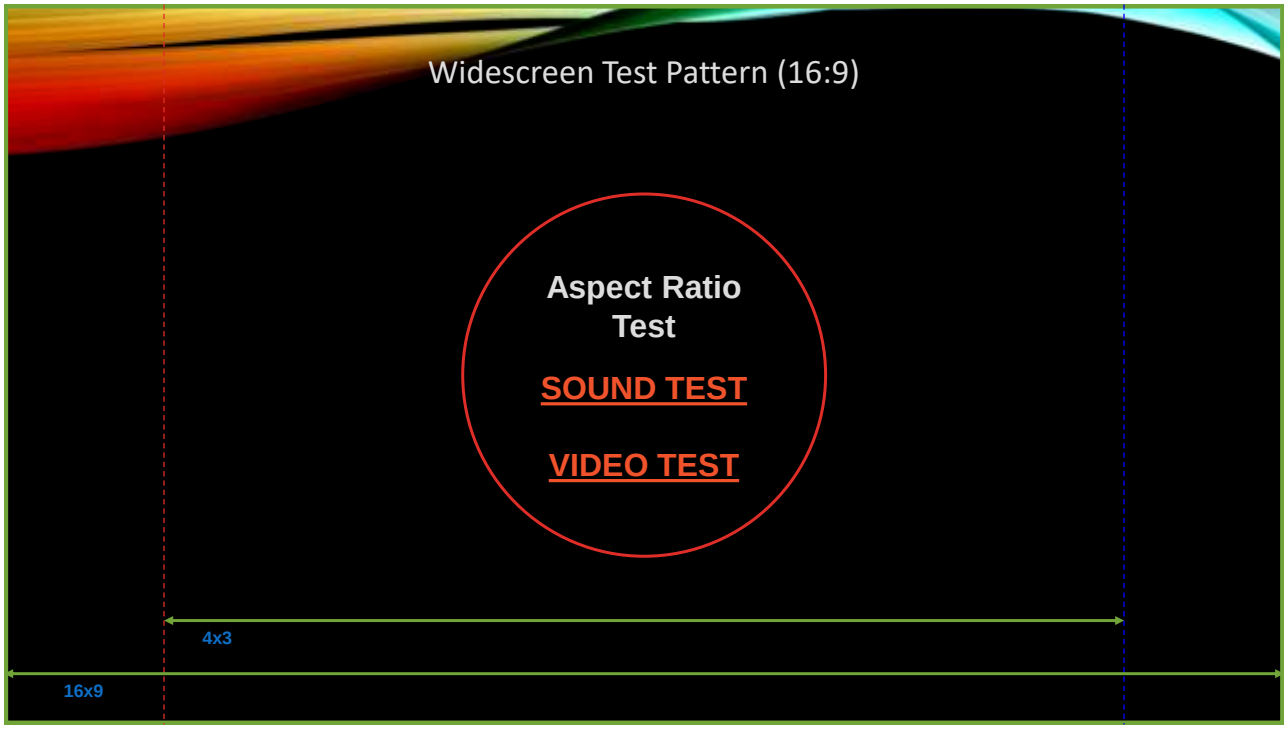

Widescreen Test Pattern (16:9)
Aspect Ratio Test
SOUND TEST
VIDEO TEST
4x3
16x9

1


MODERN BIOACTIVE RESTORATIONS:

2

WHAT IS BIOACTIVE?

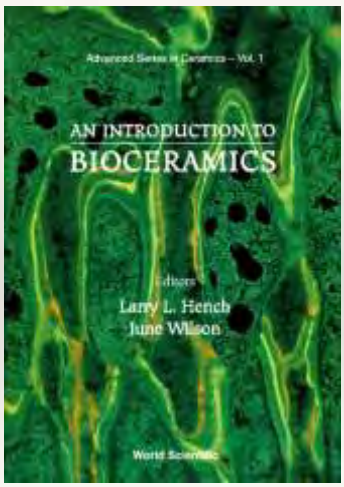
A variety of dental restorative materials are able to promote tooth remineralization and/or inhibit tooth demineralization and/or have antibacterial properties. These remineralizing materials include fluoride- and/or calcium-containing pulp capping materials, bonding agents, resin composites, resin cements, glass-ionomer cements, and sealants.

A **bioactive restorative material** can display one or more of the following actions:
1. Remineralizes and strengthens tooth structure through fluoride release and/or the release of other minerals.
2. Forms an apatite-like material on its surface when immersed in body fluid or simulated body fluid (SBF) over time.4
3. Regenerates live tissue to promote vitality in the tooth.

3

The most accepted definition of Bioactivity

- THE CONCEPT OF BIOACTIVE MATERIALS WAS FIRST INTRODUCED IN 1969 AND LATER DEFINED AS FOLLOWS:
- “A BIOACTIVE MATERIAL IS ONE ELICITS A SPECIFIC BIOLOGICAL RESPONSE AT THE INTERFACE OF THE MATERIAL, WHICH RESULTS IN THE FORMATION OF A BOND BETWEEN THE TISSUES AND THE MATERIAL.”
- HENCH L.L. 1969



4

INCREASING BIOACTIVITY BY MECHANISM →		MECHANISM OF ACTION	MATERIAL CATEGORY	PRODUCT EXAMPLES	
	NON-BIO-ACTIVE	INACTIVE FILLING RESTORATION	AMALGAMS		
			COMPOSITE RESINS		
	BIO-ACTIVE	REMINERALIZATION	GLASS IONOMERS	*SDI – Riva Self Cure, GC – Equia Forte*	
			GLASS IONOMER DERIVATIVES	*Pulpdent – ACTIVA BioACTIVE*	
			GIOMERS	*Shofu – Beautifil II and Flow Plus*	
		DEPOSITION OF HYDROXYAPATITE	CALCIUM ALUMINATES	*Doxa – Ceramir Cement*	
		PULP REGENERATION	CALCIUM SILICATES	*Mineral Trioxide Aggregate (MTA)-based materials*	Endo repair cement Not dentin substitute
				Septodont – Biodentine	Crown and root dentin restorative substitute Pulpal healing and endo repair

5

WHY??

- Latest Marketing Buzzword OR True Patient Benefit?

6

BIOACTIVITY IS FOR YOUR PATIENTS

Working with nature to help prevent micro leakage and the future of your patients restorations

7

BIOACTIVE MATERIALS?

- Glass Ionomers
- Resin Modified Glass Ionomers
- Compomers
- Flowable Composites
- Injectable Composites
- Bulk Fill Composites
- Packable Composites
- Topical/ToothPastes
- Varnishes
- Liners
- Lasers
- Cements

WHERE??

WHEN??

8

Todd Snyder, DDS, FAACD, FIADFE, ASDA, ABAD

Laguna Niguel, CA & Las Vegas, NV
Aesthetic Dental Designs®
doc@tcsdental.com

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Fellow, International Academy for Dental Facial Esthetics
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Diplomat of the American Board of Aesthetic Dentistry
Former Faculty, UCLA Center For Esthetic Dentistry
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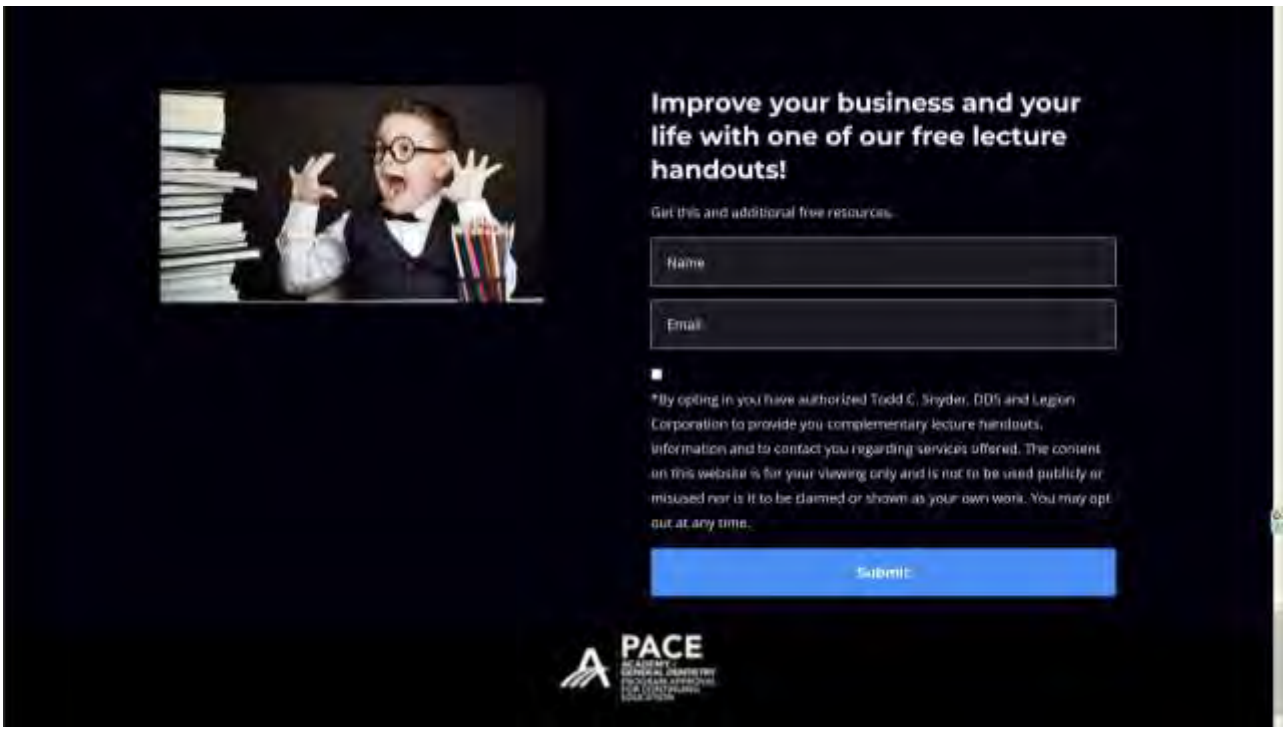
9

Please Turn On Your Cell Phones
If you want a copy of all the slides

10

Get a handout with every slide from the lecture at **www.LEGION.dentist**

11



12

Crystal Structure Diagnostics

The Canary System Detects Cracks & Cavities not Visible on X-rays

+ Around & beneath intact margins of fillings & crowns
+ Under sealants (including opaque sealants)
+ On proximal surfaces
+ On smooth surfaces, pits & grooves
+ Around orthodontic brackets

Measures tooth structure breakdown, allows for early treatment

+ Restore conservatively
+ Remineralize back to health
+ Seal with confidence

Research claims validated by 60+ papers

15+ case reports & 2 FDA CFR 21 clinical trials

13

The Science Behind The Canary System

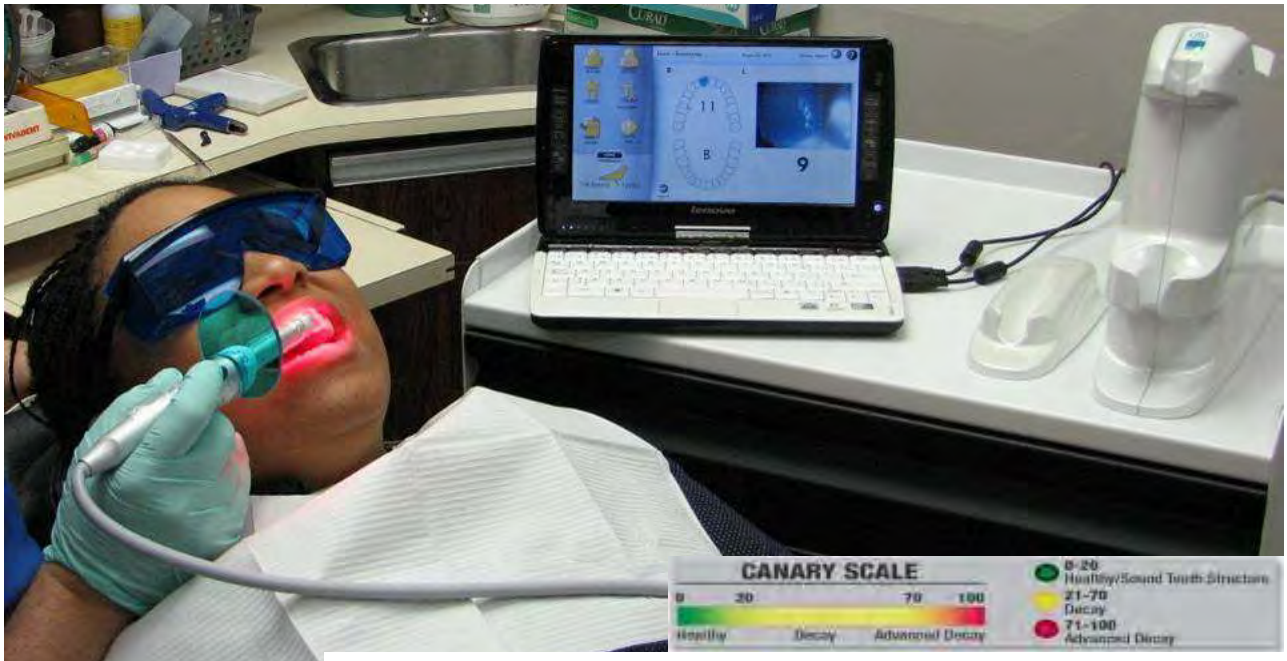
- Pulses (2 Hz) of laser light hit the tooth surface.
- Tooth glows (Luminescence, LUM) and releases heat (Photo-Thermal Radiometry, PTR).
- Defective tooth crystal structure affects the retained heat and luminescence signatures.

➢**Energy Conversion Technology**

Temperature increase < 1°C ***not harmful***

- Detected signals reflect the tooth's condition.
- Detects 50 micron lesion up to 5 mm below the surface.

14



Delegated Scanning & Whitening Assistant

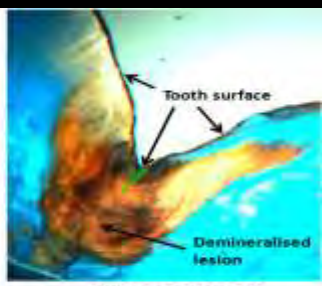
15

SENSITIVITY & SPECIFICITY STUDY: UNIVERSITY OF TEXAS OCTOBER 2012

Study Design

- 20 tooth surfaces selected with range of clinical conditions from healthy to early caries
- Visual ranking by 2 dentists
- Canary Scan
- DIAGNODent
- Polarized Light Microscopy used as the gold standard to confirm presence of lesion & depth in that section

Photographic image of scanned area (Spot B)



PLM image of Spot B

Spot	Canary Number	DIAGNOdent Peak Value	PLM Lesion Depth (µm)
B	91 ± 14	2 ± 1	808.89

Caries Detection Method	Canary System	DIAGNODent
Sensitivity	100%	18%
Specificity	100%	100%
Spearman Correlation with Lesion Depth	.84	.21

16

Canary is Superior to X-Rays for Proximal Caries Detection

Jan J et al. Caries Res 2014;48:384–450 DOI: 10.1159/000360836

Objective:

To compare the accuracy of The Canary System, ICDAS-II and bitewing radiographs in detecting proximal caries *in vitro*.

Methods:

Conclusion:

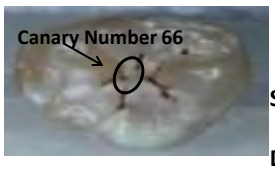
- **BW radiographs could only identify 26.7% of the lesions which questions its ability to be the gold standard**
- **The Canary System is the only method examined with both high sensitivity and high specificity.**
- **The Canary System is more sensitive than bitewing radiographs in detecting interproximal caries**

Parameter	The Canary System	ICDAS-II	BW Radiograph
Sensitivity	0.93	0.73	0.27
Specificity	0.83	0.65	0.88

17

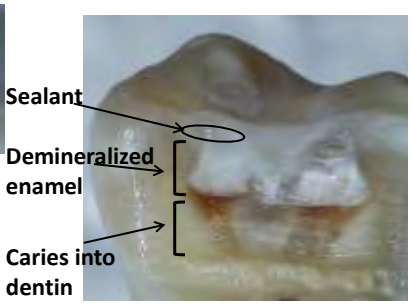
Detection of Caries Beneath Sealants

- Canary Numbers >20 when scanning sealants (3M™ ESPE™ Clinpro™ Sealant) placed over pit & fissure caries.
- The caries detection ability of the Canary System was not affected by sealant & was more accurate than DIAGNOdent.



Pre-sealant

Post-sealant

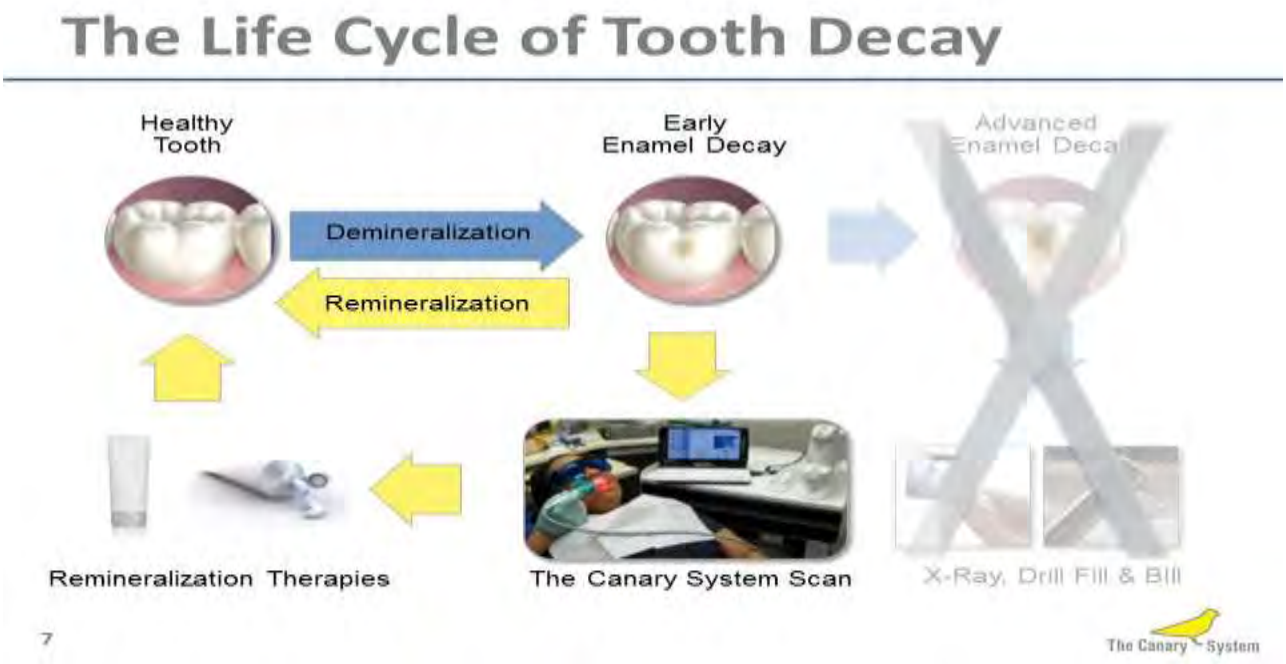


Cross-section

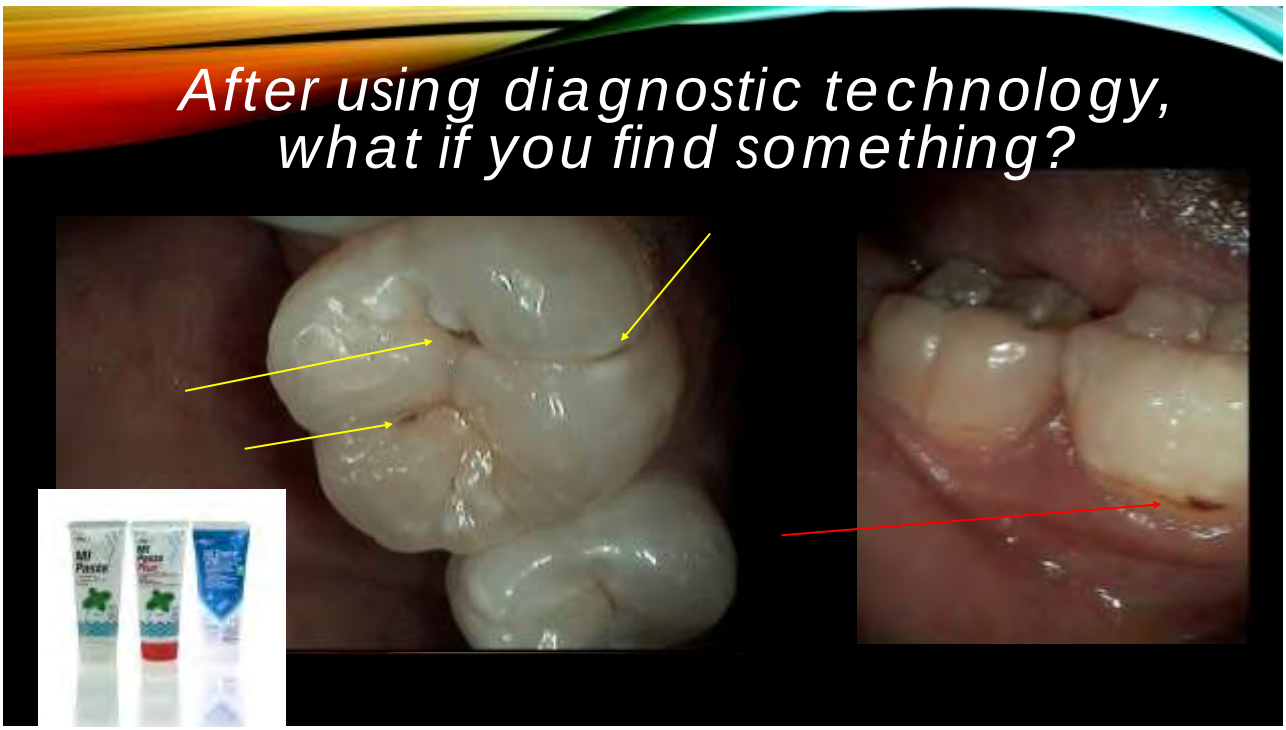
Sensitivities and specificities for pit & fissure caries detection after sealant placement.

Caries Detection Method	The Canary System	DIAGNOdent
Sensitivity	83%	64%
Specificity	79%	46%

18


The Life Cycle of Tooth Decay
Healthy Tooth
Demineralization
Remineralization
Early Enamel Decay
Advanced Enamel Decay
Remineralization Therapies
The Canary System Scan
X-Ray, Drill Fill & Bill
7
The Canary System

19


After using diagnostic technology, what if you find something?

20

TOPICAL THERAPIES

- More caries resistant
- Remineralization

21

Minimally Invasive

- Apply MIPaste Plus for 3 minutes
- Patient applies at home 2x/day

22

MINIMUM INTERVENTION

The first Professional product containing RECALDENT™ (CPP-ACP) Technology

- Prevent disease & maintain dental health
- Identify caries (cavities) risk
- Heal carious lesions (cavities) in their earliest stage
- Demineralized tooth structure can be **REMINERALIZED**

CPP-ACP

CPP-ACP
900 ppm
Sodium Fluoride

23

MI VARNISH™ WITH RECALDENT™ (CPP-ACP)

*Bioavailable **calcium, phosphate & fluoride** for an **enhanced** varnish treatment*

24

OTHER MATERIALS

- Xylitol toothpaste, rinses and gums
- Clinpro 5000 with TCP (3M)
- Enamelon with fluoride and ACP (Premier)
- Remin Pro (Voco)
- Sensodyne ProNamel
- Arm & Hammer's Enamel Care
- Arm & Hammer Complete Care w/ Enamel Strengthening
- Colgate Sensitive pro relief
- Fluoride Varnishes
- Glass Ionomers

25

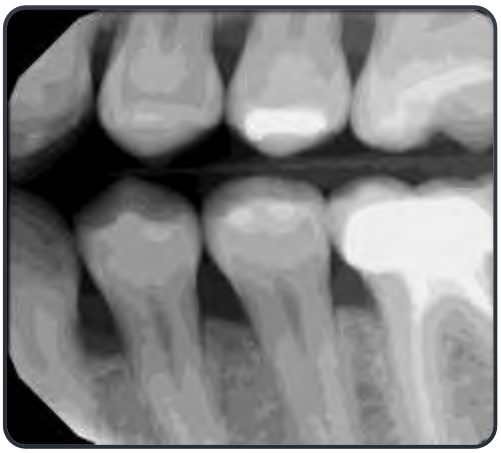
OGY

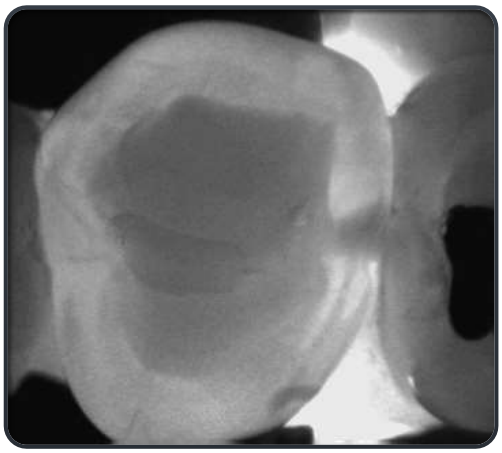
26

CariVu Fiber Optic Transillumination

27

WHERE IS THE CAVITY





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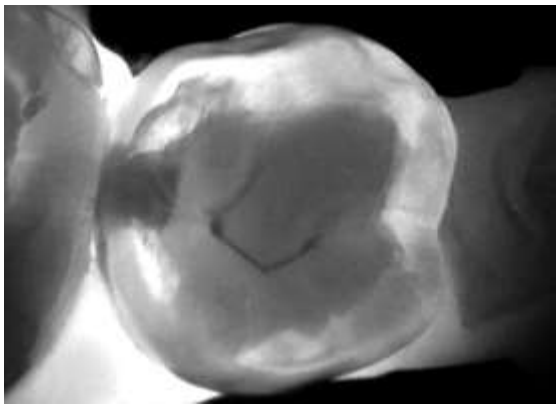
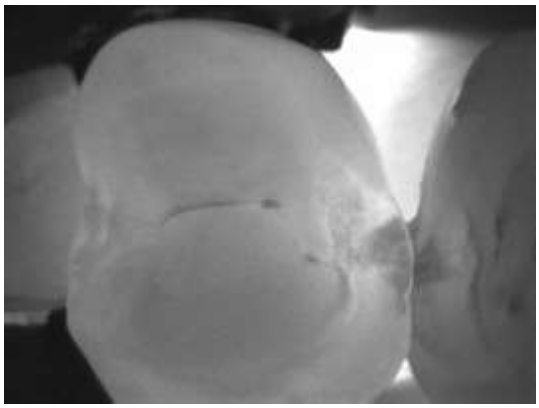
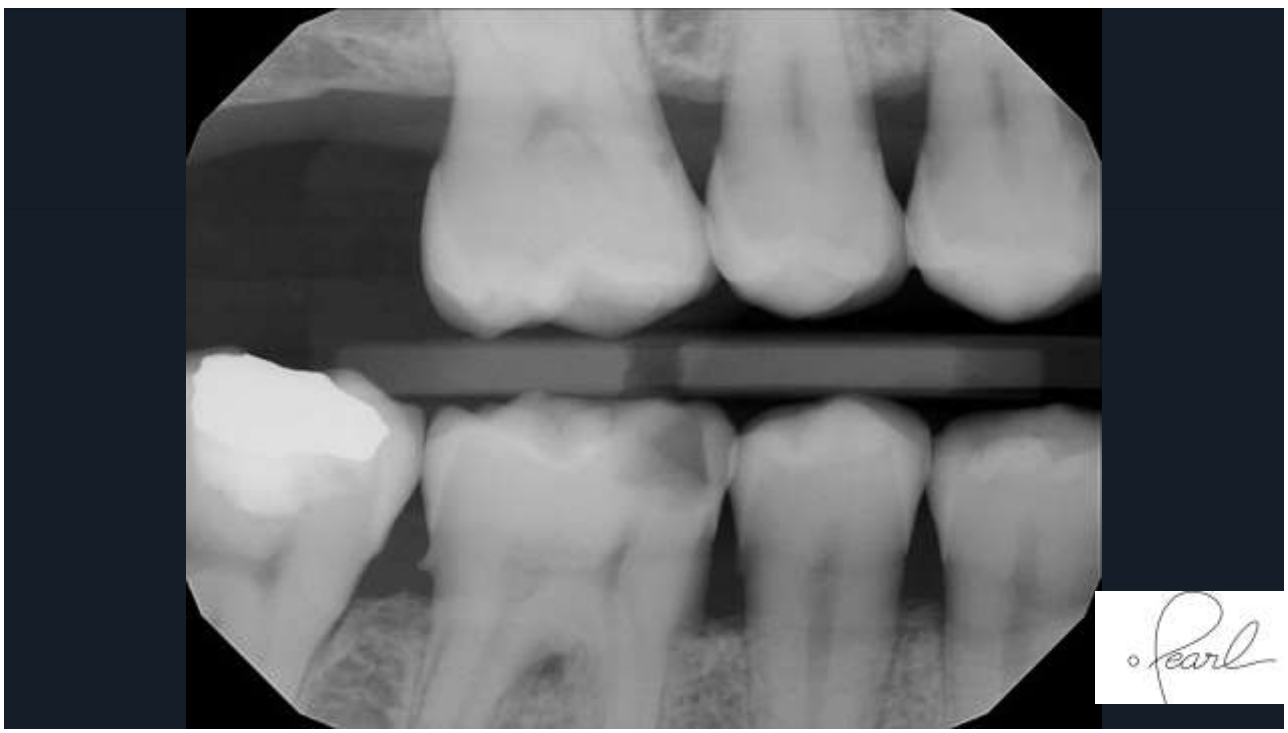


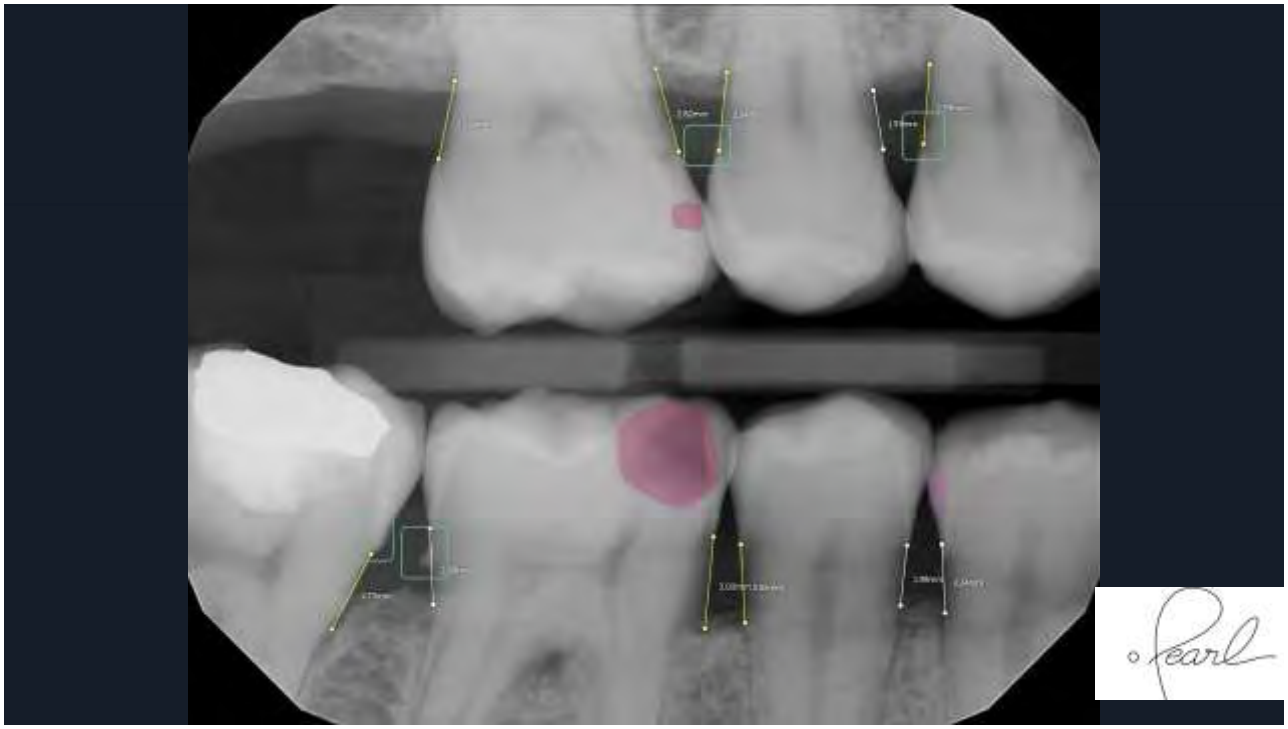


Early Diagnosis that can be Visualized

29



30



31

Problem

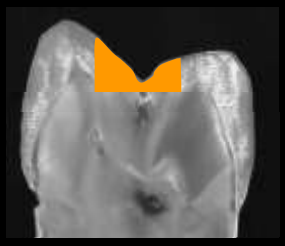
Varying tooth substrates

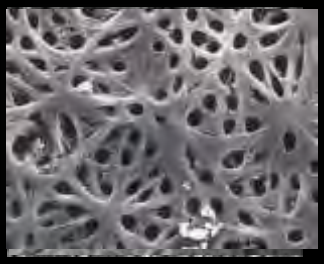
Enamel & Variable Dentin Bonding

57

What substrate are we treating?

:Composite Preparation





Class I or II

3x Tubule Density Equals Higher Fluid & Increased Difficulty for Bonding
30% Decrease in Bond Strengths with most bonding systems.

58

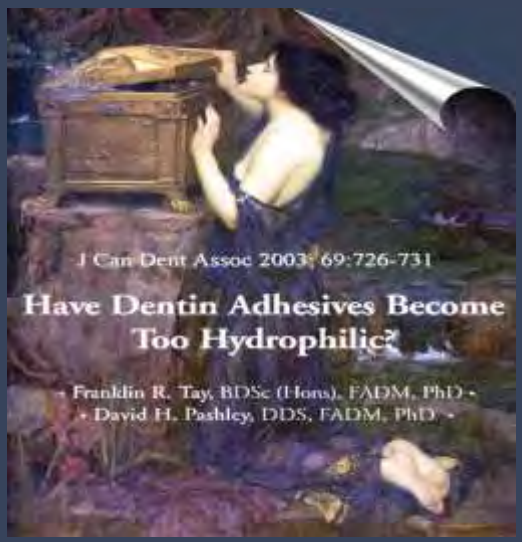
(RFA-DE-10-004)
"Tooth-colored resin restorations have an average replacement time of 5.7 years due to secondary caries precipitated by bond failure."

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148178/

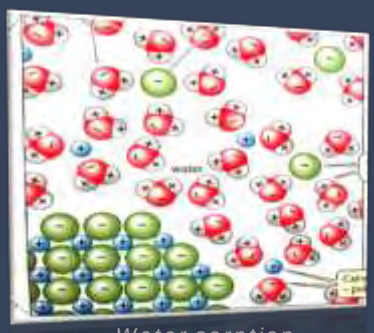
59

Factors that compromise bond durability in restorative dentistry

Hydrophilic dentin bonding



We challenged that current dentin adhesive designs that incorporate increasing concentrations of hydrophilic monomers are going in the wrong direction

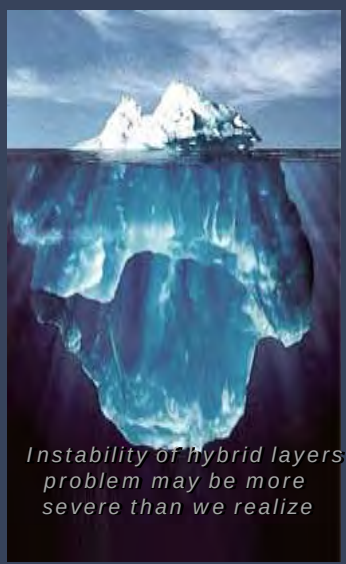


Water sorption
Polymer swelling
Decline in mechanical properties
Leaching of hydrolyzed resin components

60

Factors that compromise bond durability in restorative dentistry

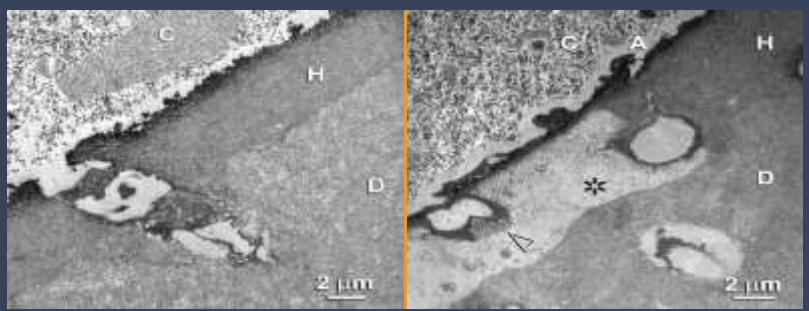
Hydrophilic dentin bonding



Instability of hybrid layers problem may be more severe than we realize

RESEARCH REPORTS
J Dent Res 2005; 84:741-746

Chlorhexidine Arrests Subclinical Degradation of Dentin Hybrid Layers *in vivo*



Intact hybrid layers created by a simplified etch-and-rinse adhesive in caries-affected primary dentin partially disappeared after 6 months of intraoral function

61

ⓘ *Factors that compromise bond durability*

Hydrophilic dentin bonding

RESEARCH REPORTS
J Dent Res 2004; 83:216-221

Collagen Degradation by Host-derived Enzymes during Aging

Demineralizing dentin is like opening ***the Pandora's box****, releasing endogenous enzymes (Matrix Metalloproteinases - MMPs) that were trapped within the mineralized dentin matrix.*

In the presence of ***water*** *(such as that derived from water sorption or from adhesives, MMPs (2,8 & 9) can breakdown collagen fibrils that are not protected by intrafibrillar minerals*

Sukala et al. (2007)
Mazzoni et al. (2007)

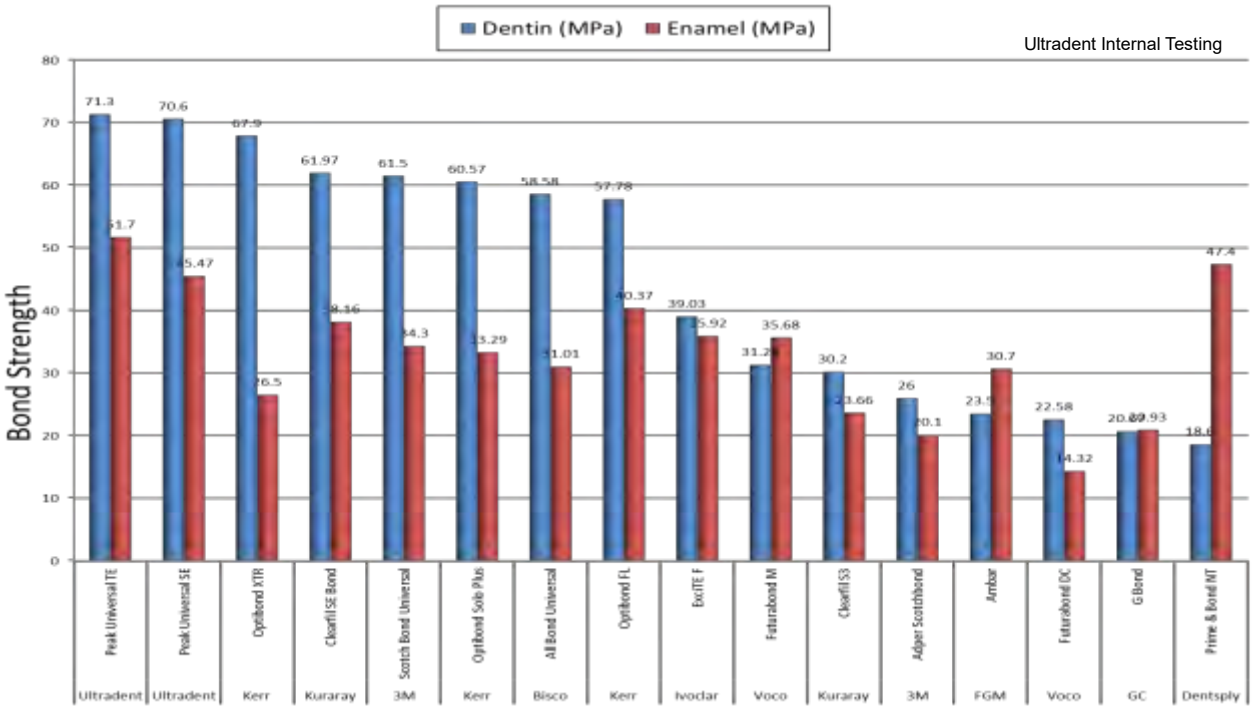
62

BOND DEGREDATION

- Pashley DH, Tay FR, Imazato S. How to increase the durability of resin-dentin bonds. Compend Contin Educ Dent. 2011 Sep;32(7):60-4, 66.

Resin-dentin bonds are not as durable as was previously thought. Microtensile bond strengths often fall 30% to 40% in 6 to 12 months.

63


Dentin (MPa)
Enamel (MPa)
Ultradent Internal Testing
Bond Strength
80
70
60
50
40
30
20
10
0
71.3
51.7
70.6
45.47
67.9
26.5
61.97
38.16
61.5
34.3
60.57
33.29
58.58
31.01
57.78
40.37
39.03
35.92
31.2
35.68
30.2
23.66
26
20.1
23.5
30.7
22.58
14.32
20.89
20.93
18.6
47.4
Peak Universal TE
Peak Universal SE
Optibond XTR
Clearfil SE Bond
Scotch Bond Universal
Optibond Solo Plus
All Bond Universal
Optibond FL
ExciTE F
Futurabond M
Clearfil SB
Adper Scotchbond
Ambar
Futurabond DC
G Bond
Prime & Bond NT
Ultradent
Ultradent
Kerr
Kuraray
3M
Kerr
Bisco
Kerr
Ivodar
Voco
Kuraray
3M
FGM
Voco
GC
Dentsply

64


Adhesives
CLEARFIL

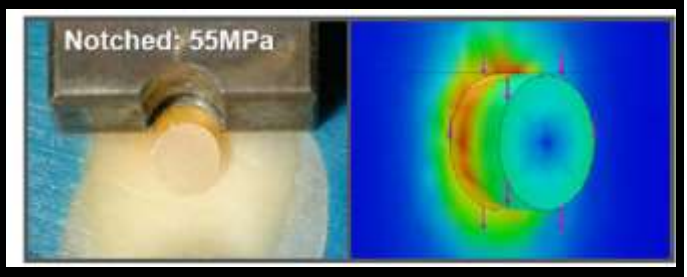
66

•Courtesy Pacific University (Dr Marc Guisberger)

67

INSTRON

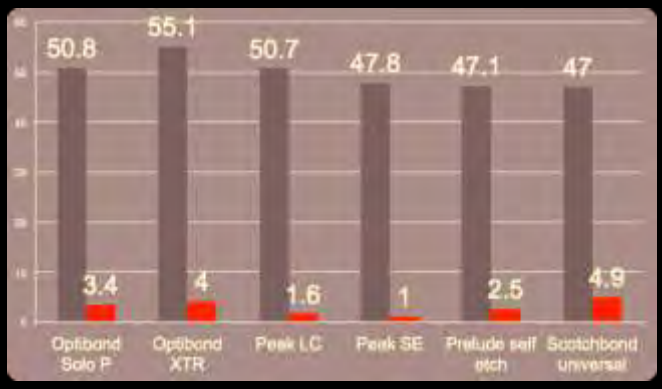
- Ultra Tester (Ultradent)
- Ultra Jig (Ultadent)



68

Courtesy Pacific University (Dr Marc Guisberger)

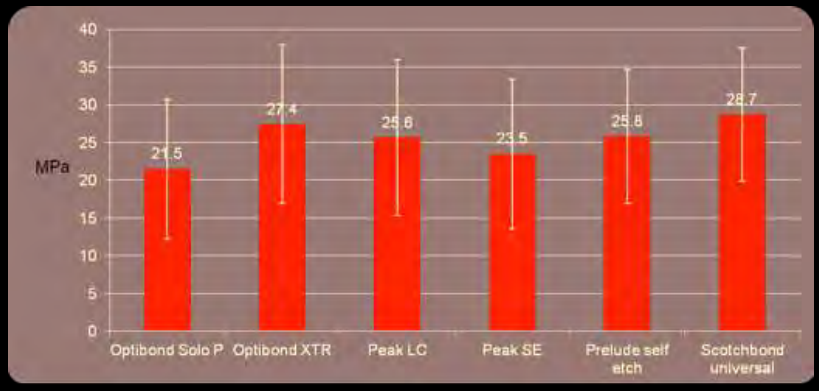
SHEAR BOND TEST RESULTS - 2012



69

Courtesy Pacific University (Dr Marc Guisberger)

SHEAR BOND TEST RESULTS - 2012



70

Van Meerbeek B, et al. Relationship between bond-strength tests and clinical outcomes. Dent Mater (2009), doi:10.1016/j.dental.2009.11.148

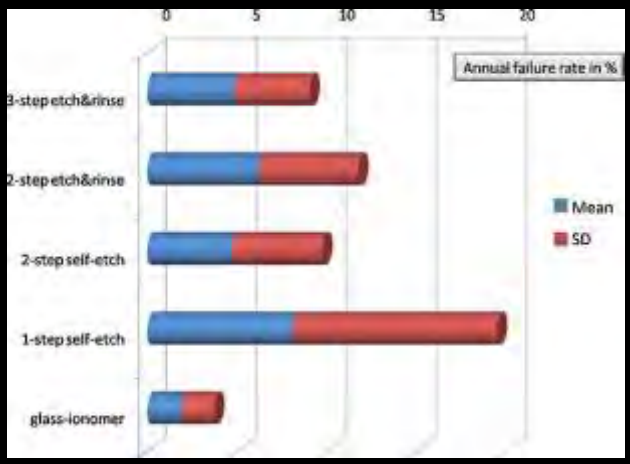


Fig. 15 – Graph representing the mean annual failure rates per adhesive class, determined according to a systematic review of Class-V clinical trials of adhesives during the period 1998–2004 [2].

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CLINICAL TIPS WITH UNIVERSAL ADHESIVES

1. Air Dry The Water Based Adhesive or Primer Fully To Evaporate Water. The Universal, Single-Bottle Adhesives Have Higher Concentration of Water & Alcohol, So Make Sure To Air Dry About 10's Until Water Is Evaporated.

2. Inadequate Drying Will Result in Lower Bond Strengths Water, Alcohol & Acetone Prevent The Resin From Curing So They Must Be Evaporated.

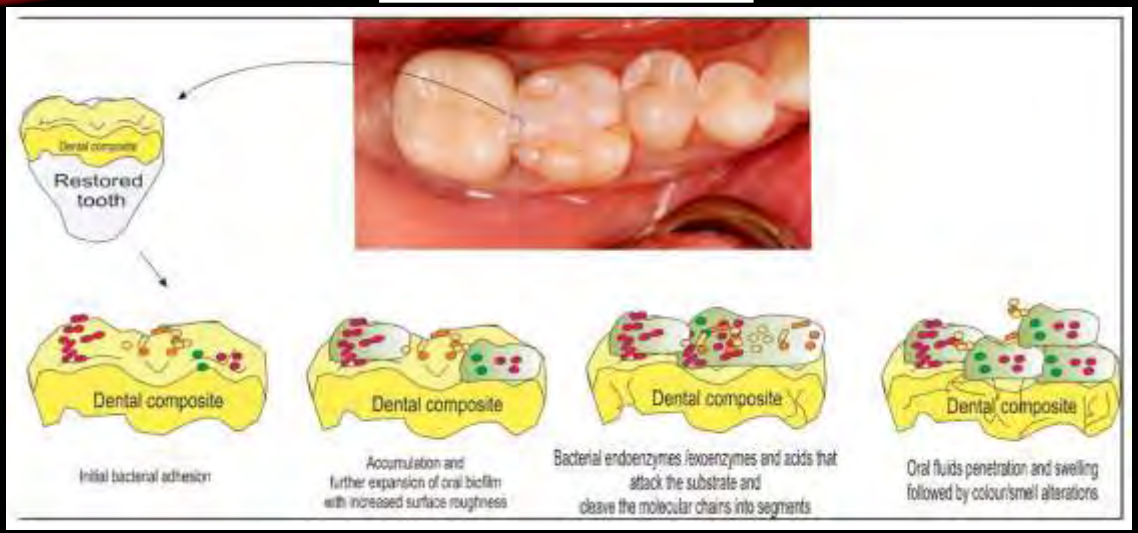
72

DRAWBACKS OF ANY COMPOSITE RESIN

- Material placement techniques
- Variable substrate
- Polymerization stress & shrinkage
- Water absorption
- Hydrophobic bonding agents
- Decreased adhesive bond strength over time
- MMPs and Cathepsins
- Microleakage

73

ORAL BACTERIA DEGRADATION OF RESIN RESTORATIONS



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MORE RESEARCH

American Journal of Dentistry Oct 2017

- https://www.researchgate.net/publication/321184952_The_role_of_adhesive_materials_and_oral_biofilm_in_the_failure_of_adhesive_resin_restorations

75

Direct Restorative Problems

Varying tooth substrates

Enamel & Variable Dentin Bonding

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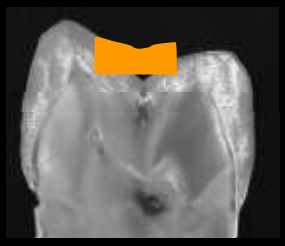
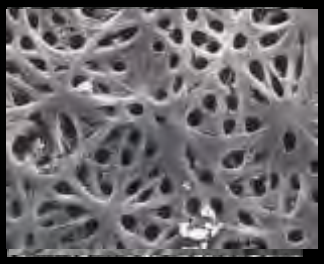
What substrate are we treating?

:Composite Preparation





Class I or II

3x Tubule Density Equals Higher Fluid & Increased Difficulty for Bonding
30% Decrease in Bond Strengths with most bonding systems.

77

SUBSTRATE

- Enamel has longest lasting bonds when a sound technique is used
  - But has occlusal loading
  - Abrasion
  - Biofilm
  - Acid attacks
- Dentin highest bond strengths superficially when a sound technique is used.
  - More technique sensitive
  - Variable risks based on depth
  - MMPS

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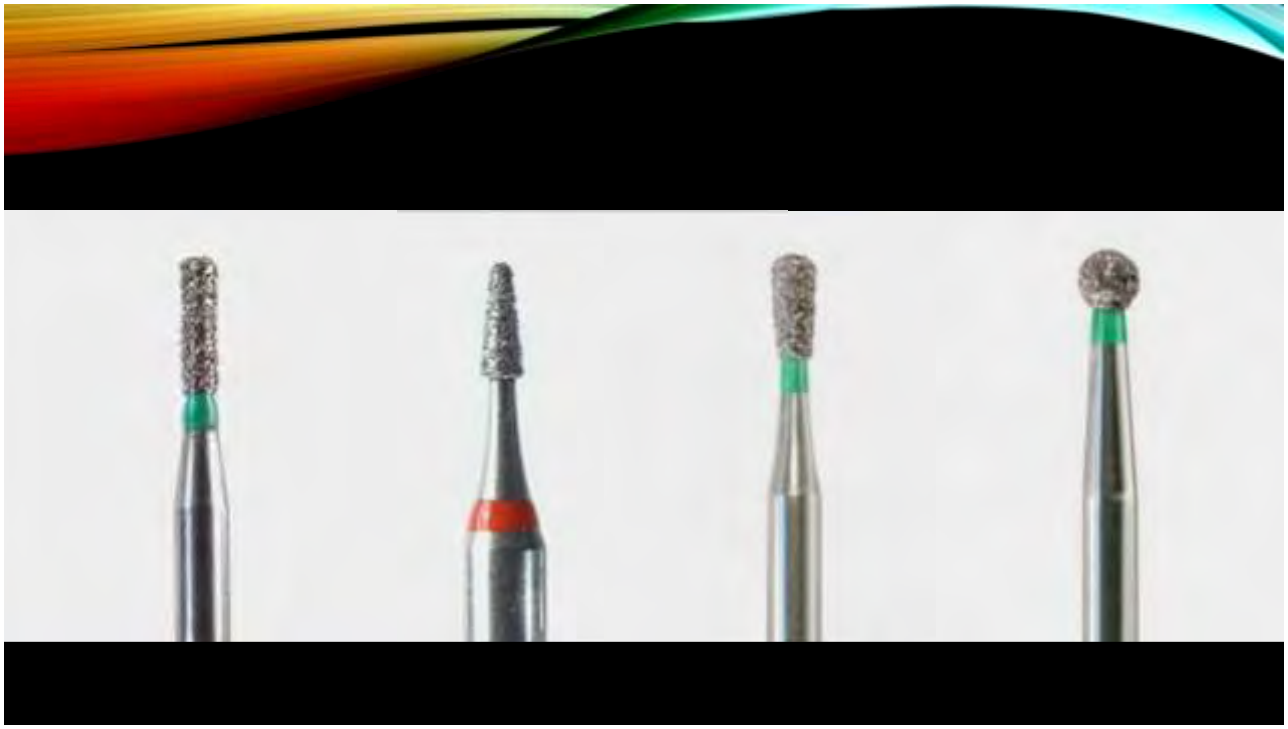
PREPARATION

Retentive and Conservative

Limited to removal of Pathology

79

80



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Flowables *(if you have good moisture control)*

- *Access, viscosity, small areas*
- *Deep, narrow, preparations*
- *Lots of enamel*

…if not use a conventional glass ionomer

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Cavity Depth	Product Recommendation
Up to 2 mm	G-ænial™ Flo X or
	G-ænial™ Universal Injectable
Up to 4 mm	G-ænial™ BULK Injectable
4-6+ mm	G-ænial™ BULK Injectable & G-ænial Sculpt®

84

G-AENIAL BULK INJECTABLE

- Injectable high strength nanoparticle composite with ideal viscosity handling and adaption characteristics that may be used as a one step application for bulk filling up to the occlusal surface without the need for capping or veneering with another composite

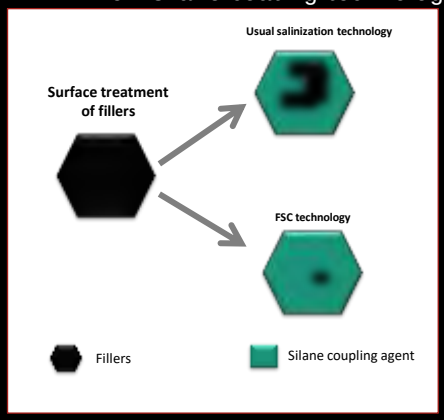
86

GC proprietary FSC and HPC technologies

The secret behind: a state of the art composition

FSC technology : Full-coverage Silane Coating

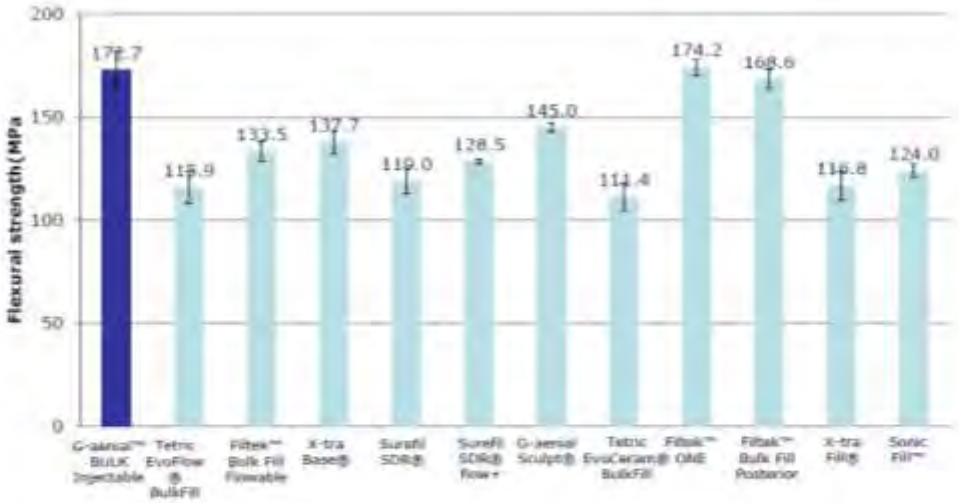
New silane coating technology was realized fully covered nano-filler with silane coupling agent.



- High Filler Content
- Efficient chemical bonding between filler and resin matrix

High Physical Properties
&
No degradation

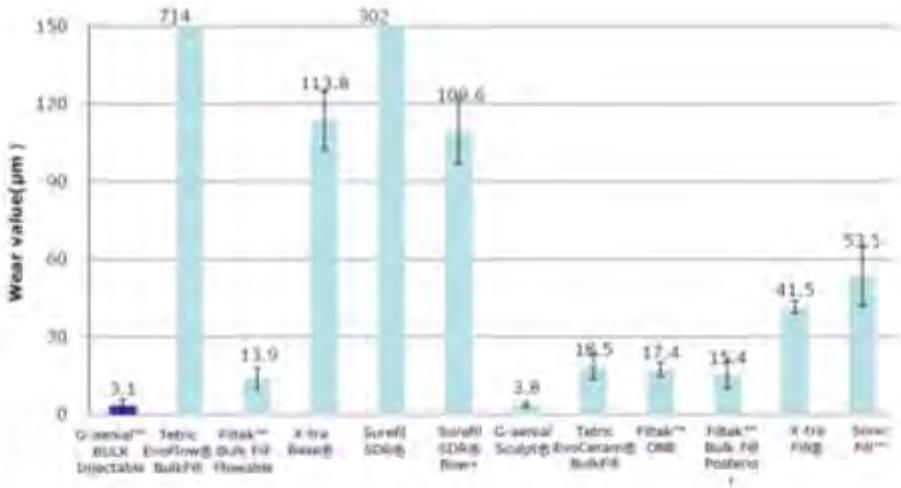
88



G-aenial™ BULK Injectable exhibits very high Flexural Strength, which translates to a **lower risk of chipping or fracture.**

Source: GCC R&D

89



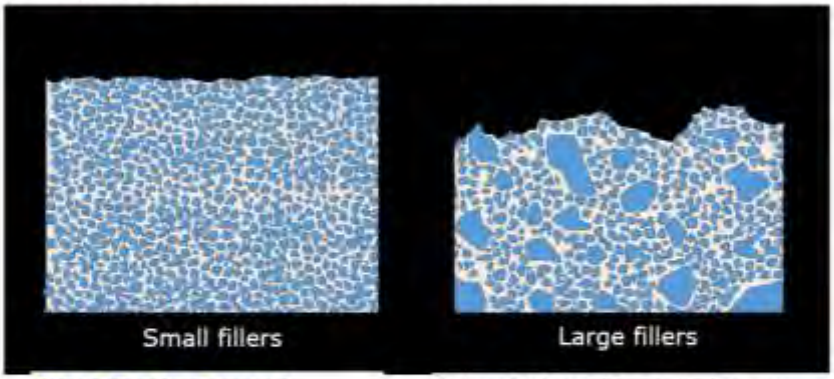
G-aenial™ BULK Injectable shows the highest wear resistance compared to the competitive set. This measure indicates that **the material will provide a highly durable and long-lasting restoration.**

Source: GCC R&D

90

WEAR RESISTANCE

GBI features **nano-particle filler technology.** When combined with Full-Coverage Silane Coating (FSC) technology, the result is a homogeneous, uniformly dispersed layer. Some competitive products feature larger particles which may be "plucked" from the surface when subjected to opposing forces within the mouth, leading to the deterioration of the restoration over time.

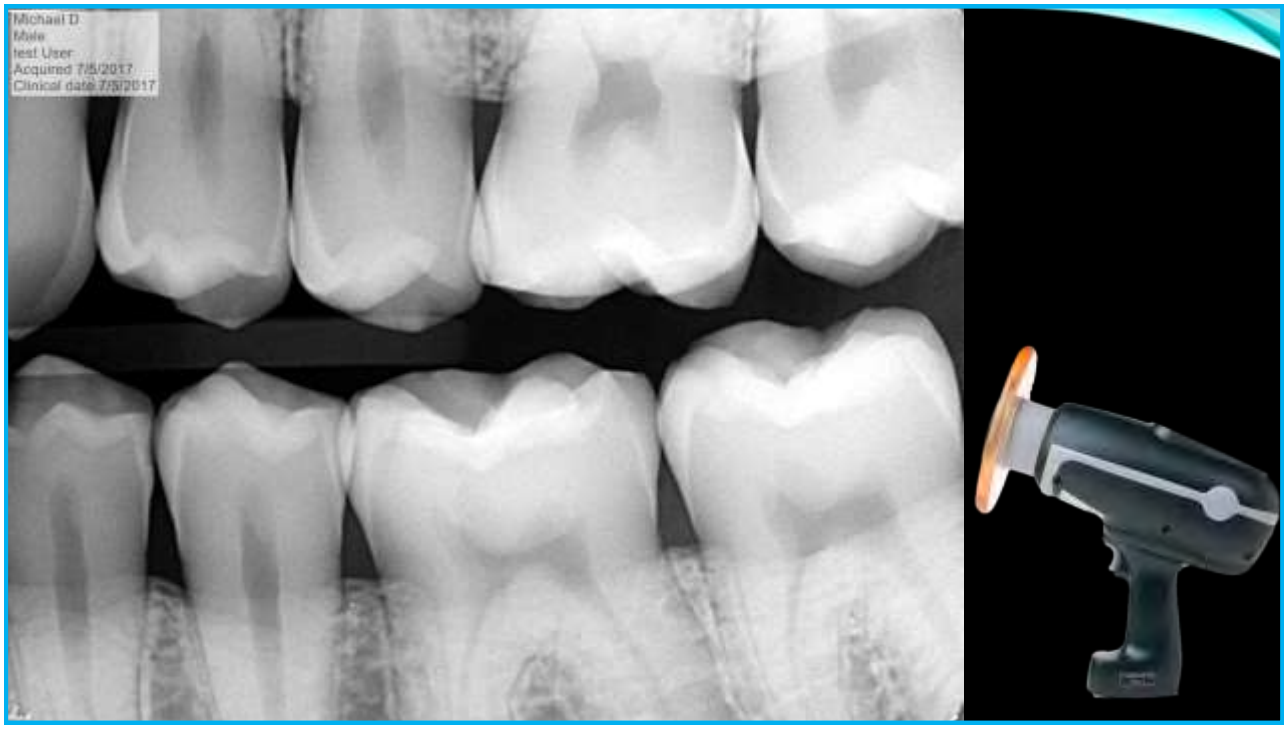


Small filler is dispersed uniformly, occlusal load is distributed equally and sustains less damage to the surface of material.

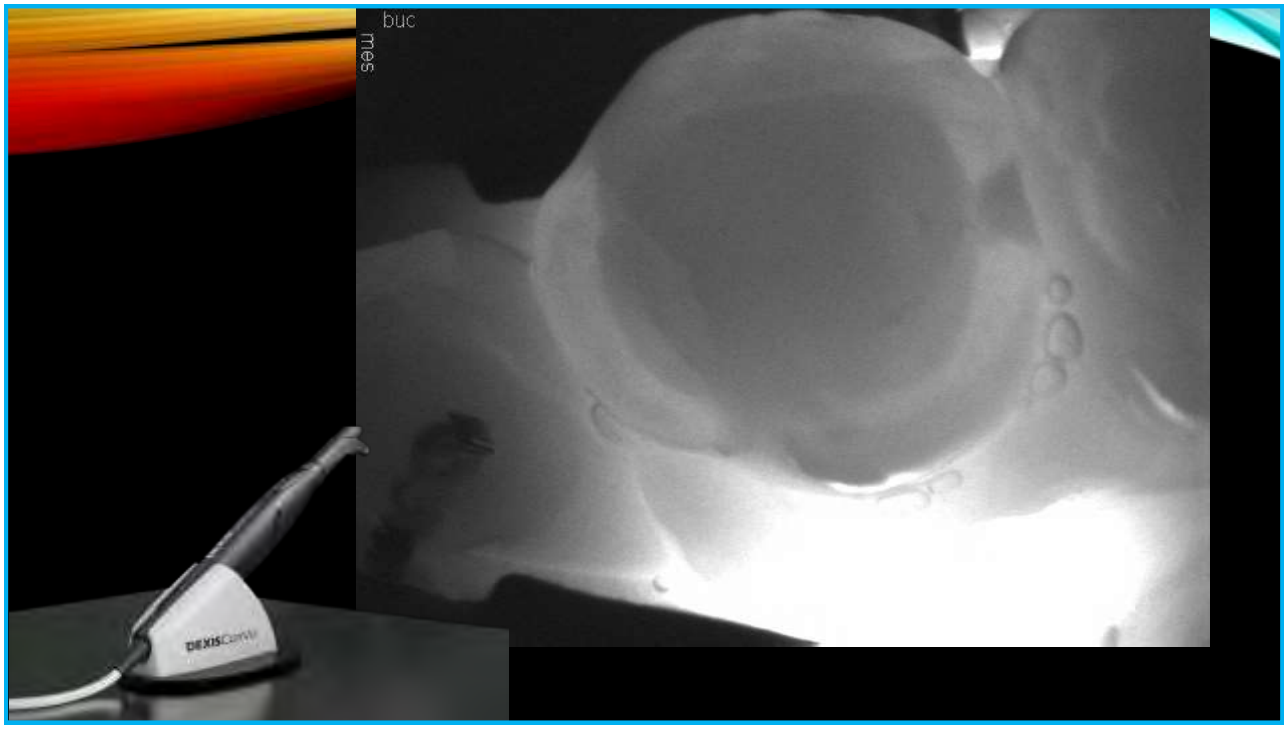
When high load is applied, large filler particles come off easily, causing an uneven surface which leads to a higher degree of wear.

Source: GCC R&D

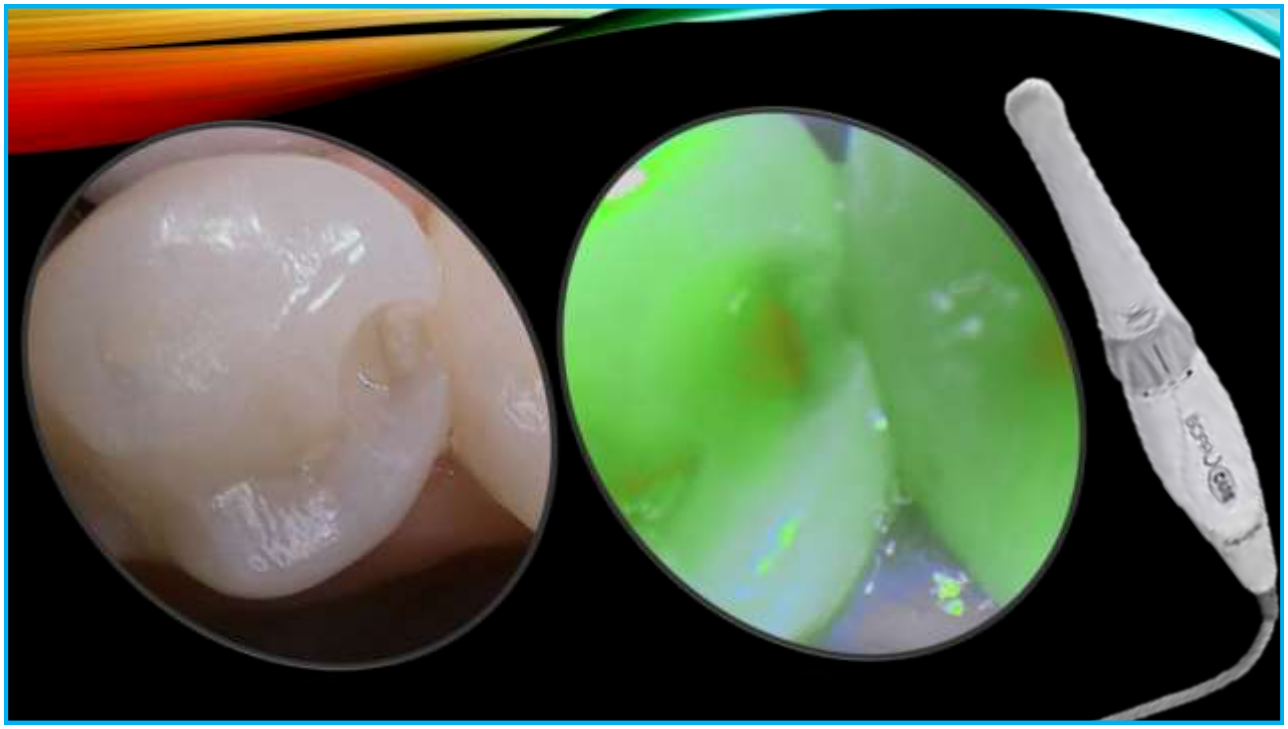
91


Michael D
Male
test User
Acquired 7/5/2017
Clinical date 7/5/2017

92

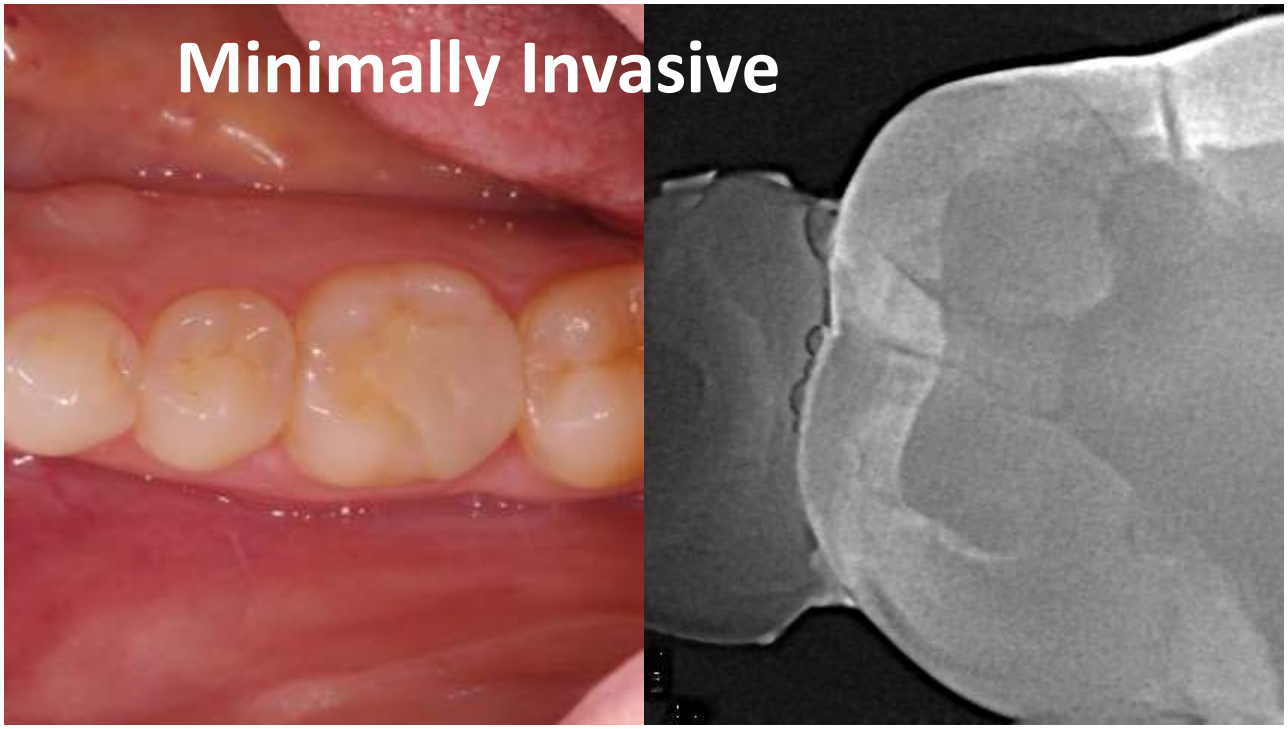

buc
mes

93



94

95



96

97

98

Wedge Guards (TrioDent /Ultradent)

99

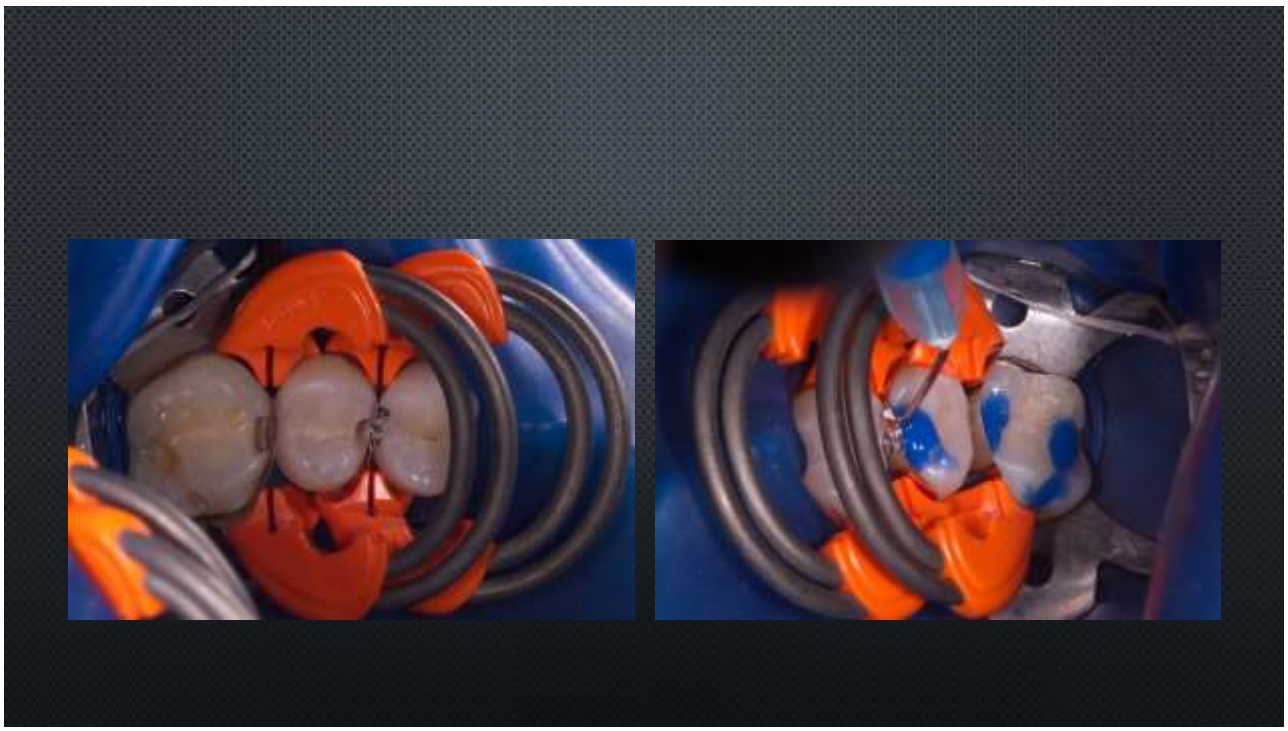
FenderWedges (Garrison Dental)

100

Fendermate (Directa Dental)

101

102



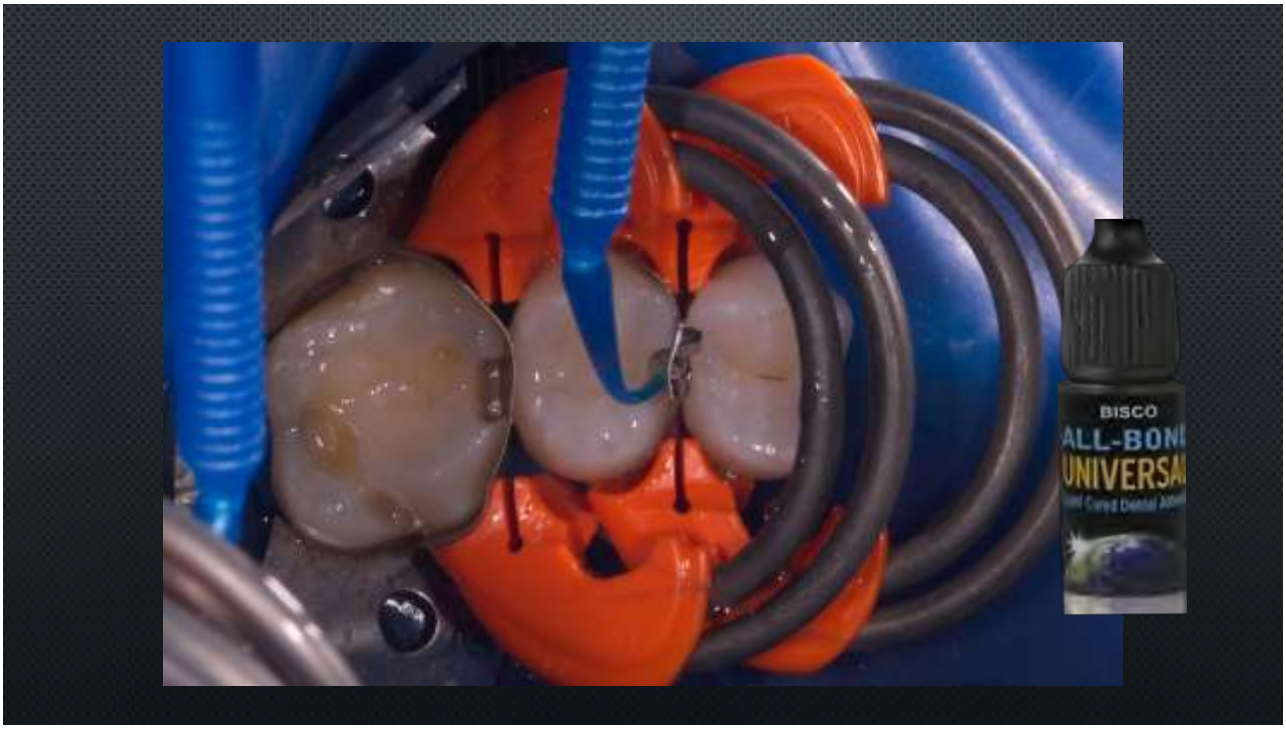
103

Uni-Etch is a 32% semi-gel phosphoric acid etchant available with Benzalkonium Chloride (BAC) and designed for **etching** tooth structure prior to bonding.

104

Select HV Etch is a 35% high viscosity phosphoric acid etchant available with Benzalkonium Chloride (BAC) and is designed for pin-point accuracy.

105



106

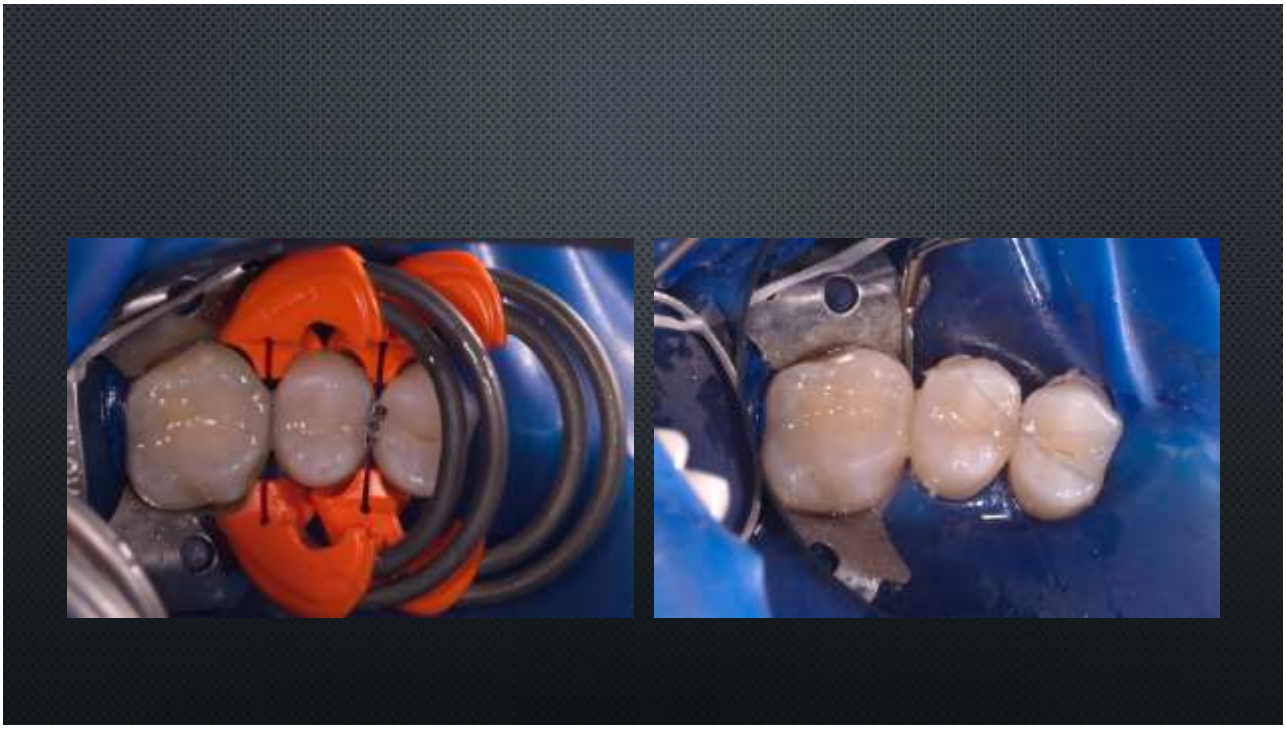
- **Light-Cured Dental Adhesive**
  All-Bond Universal is a truly universal adhesive it can be used with direct and indirect restorations and is formulated to be compatible with light-, dual- and self-cured materials. The versatility of All-Bond Universal makes it an indispensable part of any dental practice.
- **Unique Benefits:**
- Not moisture sensitive use on wet, dry or moist tooth structure
- Impressive bond strength to ALL substrates
- Use with ALL direct and indirect restorations (<10 micron thickness)
- Ideal chemical balance for both total- and self-etch adhesion from one bottle
- Compatible with ALL resin cements (no additional activator required)
- Virtually no post-operative sensitivity
- **Clinical Significance:**
- All-Bond Universal offers the flexibility for total-, self- and selective-etch procedures
- All-Bond Universal is compatible with all light-, self- and dual-cured resin composite and cement materials for all direct and indirect procedures
- All-Bond Universal works with dual cure resins, NO activator is required

107


curion
Don’t miss our ODA ASM Show Specials
Valid during April 18-19, 2024
Scan QR code to view all ODA promotions
Or stop by booth
#1219
to place your order
curion
dentistry. curated.

108

111



112

113

119

120


V3 RING (TrioDent /Ultradent)
5mm

122


Selective Etch Enamel Only
5mm
Ultra-Etch

123

124

BISCO's Cavity Cleanser is a 2% chlorhexidine digluconate aqueous solution intended for cleansing and moistening/re-wetting cavity preparations.

125

126

G-aenial BULK Injectable

"operates like a flowable but performs like a restorative"

- Bis-GMA free / Radiopaque
- High Strength & Wear Resistance
- High density uniform dispersion nanofiller technology
- Sculptable

127

128

G-AENIAL **A'CHORD™**

- A Universal composite with unishade simplicity
- 5 core shades achieve esthetics of all 16 shades of the Classic VITA® range (covers ~90% of clinical cases)
- Proprietary Full-Coverage Silane Coating (FSC) and High-Performance Pulverized CERASMART® (HPC) filler provide excellent physical and esthetic properties
  - High color and gloss retention
  - High wear and stain resistance
  - Superb handling
- Truly universal restorative, use in anterior or posterior, large cavities or small
- Natural fluorescence in any light, UV light included!
- Additional layering shades available to further customize esthetics in challenging cases
- High radiopacity (318%) to identify restorations on radiographs

129


SIMPLIFIED UNISHADE SYSTEM
A1
A2
A3
A3.5
A4
A1 B1 D2
A2 B2 C1 D3
A3 B3 C2 C3 D4
A3.5 B2 C4
A4
Core shade of G-ænial A'CHORD™ (about 15 mg) placed on the middle of each shade tab
5 CORE Shades to cover all your needs
Source: GCC R&D

130


VISALYS FILL
CAPS
A2
A2
A2
VISALYS FILL
SYRINGE
VISALYS FLOW
SYRINGE
KETTENBACH DENTAL
Simply intelligent

131

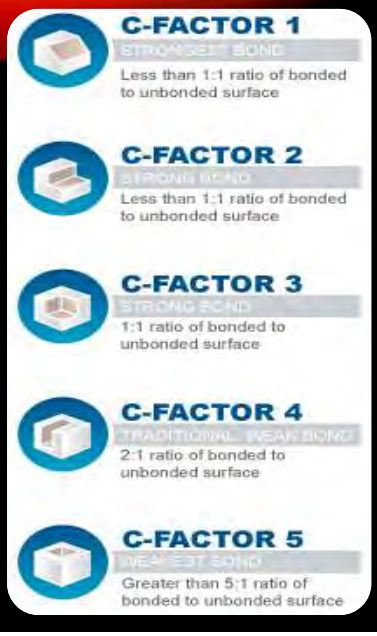
"C-FACTOR"

Base/ Lining

Excellent Flow & Handling

132

"C-FACTOR" DEFINITION



Lowest Stress

Low Stress

Medium Stress

High Stress

Highest Stress

Configuration Factor:

"The ratio of bonded** to un-bonded „(free) **surfaces"

Feilzer, DeGee, Davidson (1987), Universtiy of Amsterdam, ACTA

133

"***Adhesive dentistry could be expressed as a simple relationship between bonds and stress.*** *If the bonds can withstand the stress, the restorative technique will be* ***successful.***"

Unterbrink and Liebenberg (1999)

134

Shrinkage stress is the pressure put on the adhesive and surrounding tooth structure during the polymerization process. If this pressure exceeds the adhesive bond, or the strength of either the composite or tooth, it can cause a variety of problems, such as:

- Debonding resulting in internal or marginal gaps
- Fractures in the material and/or tooth structure
- Marginal staining
- Microleakage
- Secondary caries
- Postoperative sensitivity

135

136

COMPEX HD BY ADDENT

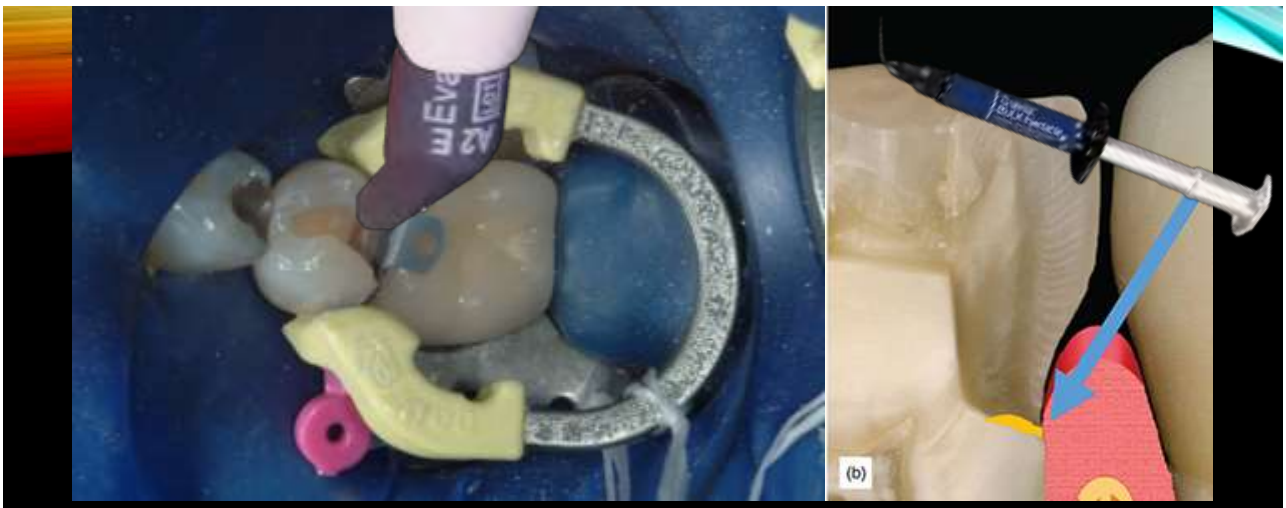
FEATURES
- Light weight handheld rechargeable device.
- Heats all compules with diameter of 6.32mm to 6.68mm
- Heats compules in 1-2 minutes.
- Heats compules to 155°F (68°C)
- Heats up to 100 compules without recharging.
- Easy to load and unload with patented ejector mechanism.
- Silicon sleeve seals compule orifice.
- Barrier bag covers entire handle.
- Short recharge time.

BENEFITS
- Comfortable all in one heater and dispenser – saves space, easily moved room to room.
- Heats composite compules currently on the market.
- Quick turn around with next compule
- Delivers all compules without temperature loss. Makes all composite materials easy to extrude.
- Charge no more than once per week under normal use.
- Fast compule insertion and removal saves time.
- Autoclavable silicone sleeve covers entire length of compule and heater for ideal asepsis.
- Disposable barrier bag minimizes cross contamination by dentist or assistant.
- Full charge time is only 4 ½ hours

137

- **Composite Warming and Science**
- Over 60 studies have shown the benefits of heating composites prior to placement. Virtually all the studies used the AdDent Calset, the first composite heater designed for the dental profession. These proven benefits include Increased flow as you would expect but the results go much further.
- **BENEFITS OF PRE-HEATED COMPOSITE:**
- Ease of dispensing viscous materials.
- Greater depth of polymerization and increased strength
- Shorter curing time
- Better adaptation to cavity walls
- Less microleakage
- Better color stability
- Less shrinkage and shrinkage stress.
- Less enamel fractures due to shrinkage stress.
- Less patient post-operative sensitivity.
- Longer lasting restoration.

138

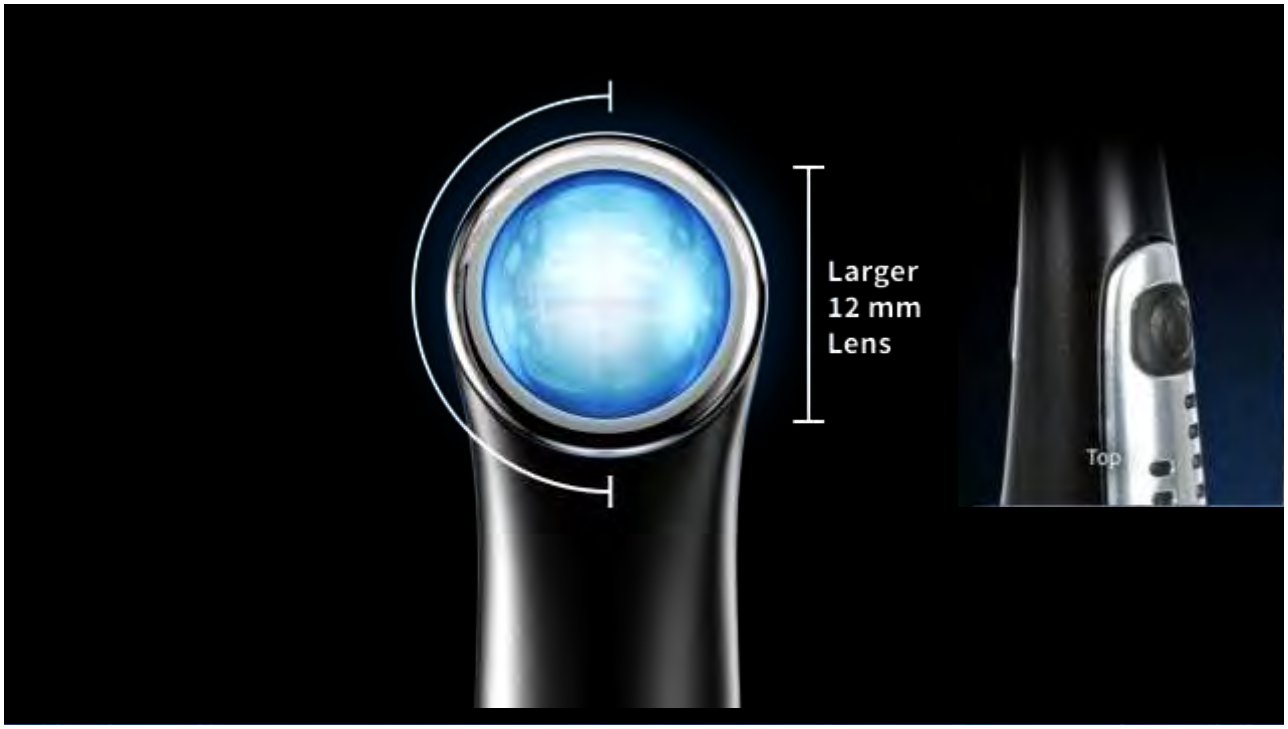


- ADA Report stated that 86% of dentists use a flowable as a first increment due to adaptation concerns.

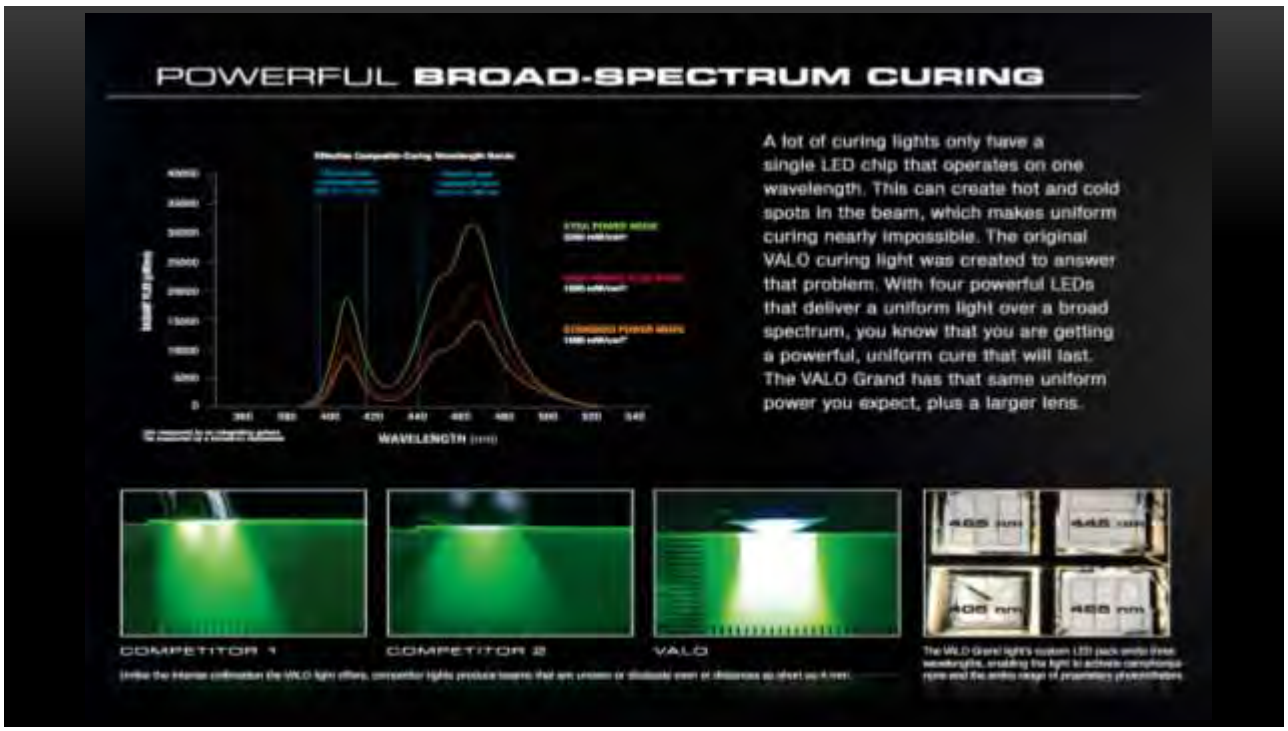
139

140

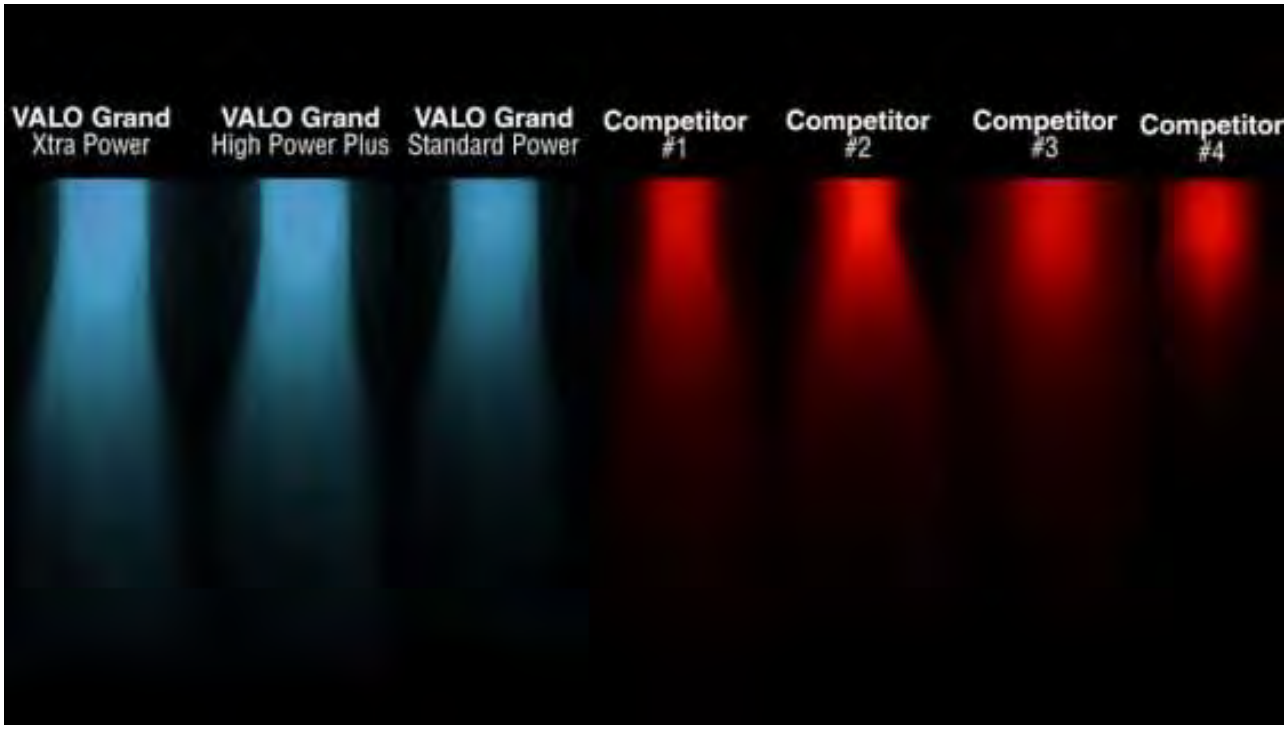
141


Larger
12 mm
Lens
Top

142


POWERFUL BROAD-SPECTRUM CURING
A lot of curing lights only have a single LED chip that operates on one wavelength. This can create hot and cold spots in the beam, which makes uniform curing nearly impossible. The original VALO curing light was created to answer that problem. With four powerful LEDs that deliver a uniform light over a broad spectrum, you know that you are getting a powerful, uniform cure that will last. The VALO Grand has that same uniform power you expect, plus a larger lens.
WAVELENGTH
COMPETITOR 1
COMPETITOR 2
VALO

143



144

Machined from Aerospace Aluminum

145

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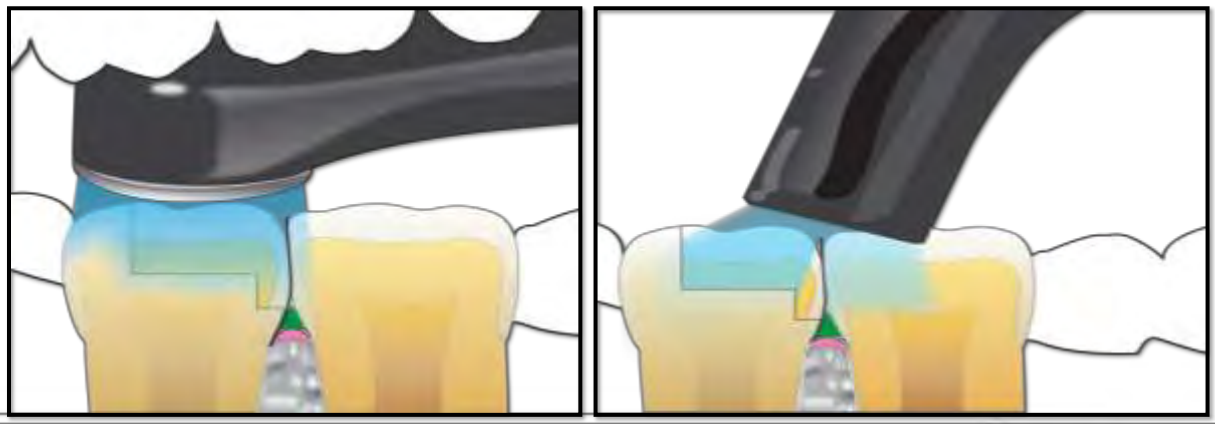
Access to the curing site = Energy to the resin



148

149

150

151

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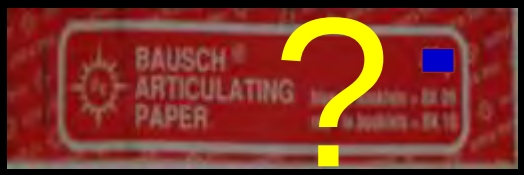
Human Hair 60 –120um
6,000 – 12,000nm

Red Blood Cells 2 – 5um
200-500nm



153

SHIMSTOCK & ARTICULATING PAPER

What do you use…..

….and why?

154

SHIMSTOCK & ARTICULATING PAPER

- Parkell Accufilm II is 21µm for dentistry
- Great Lakes articulating ribbon 12µm
- 8µm Almore Shimstock foil
- 8µm articulating paper??

155

What do you use…..

….and why?

8µm articulating paper
Available in blue

Mark the bite before prepping teeth!!

156

TROLLDENTAL-

4.5MM ARTICULATING PAPER
WWW.TROLLDENTALUSA.COM

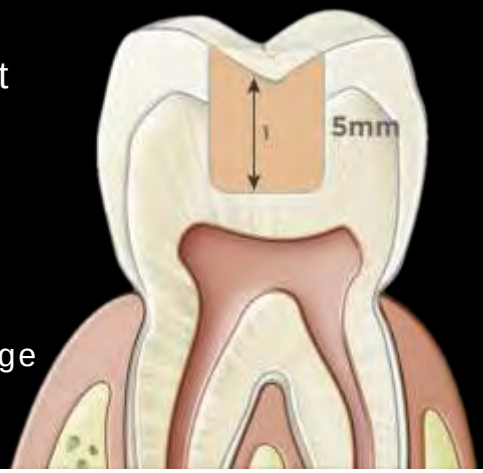
DIRECTA DENTAL

157

LIGHT CURED BULK FILL COMPOSITES

- Dentin & Enamel Replacement
  - Requires one layer
  - 1.6%-2.4% vol. shrinkage
  - 2.3-2.8mpa shrinkage stress
  - Light penetrates farther

  - So large quantity = larger shrinkage
  - 2.4% X 5mm= 0.12mm



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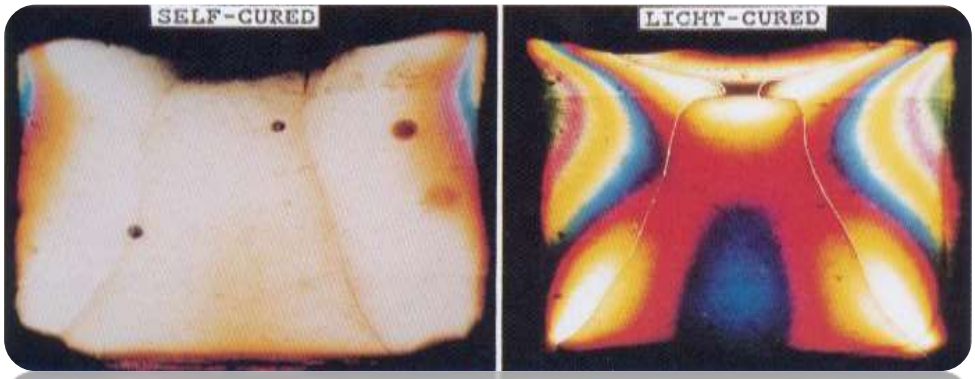
Internal (Polymerization) Stresses of Composites



"A Simple Pain-Free Adhesive Restorative System by Minimal Reduction & Total-Etching (1993)
Takao Fusayma DDS,
Tokyo Medical & Dental University

159

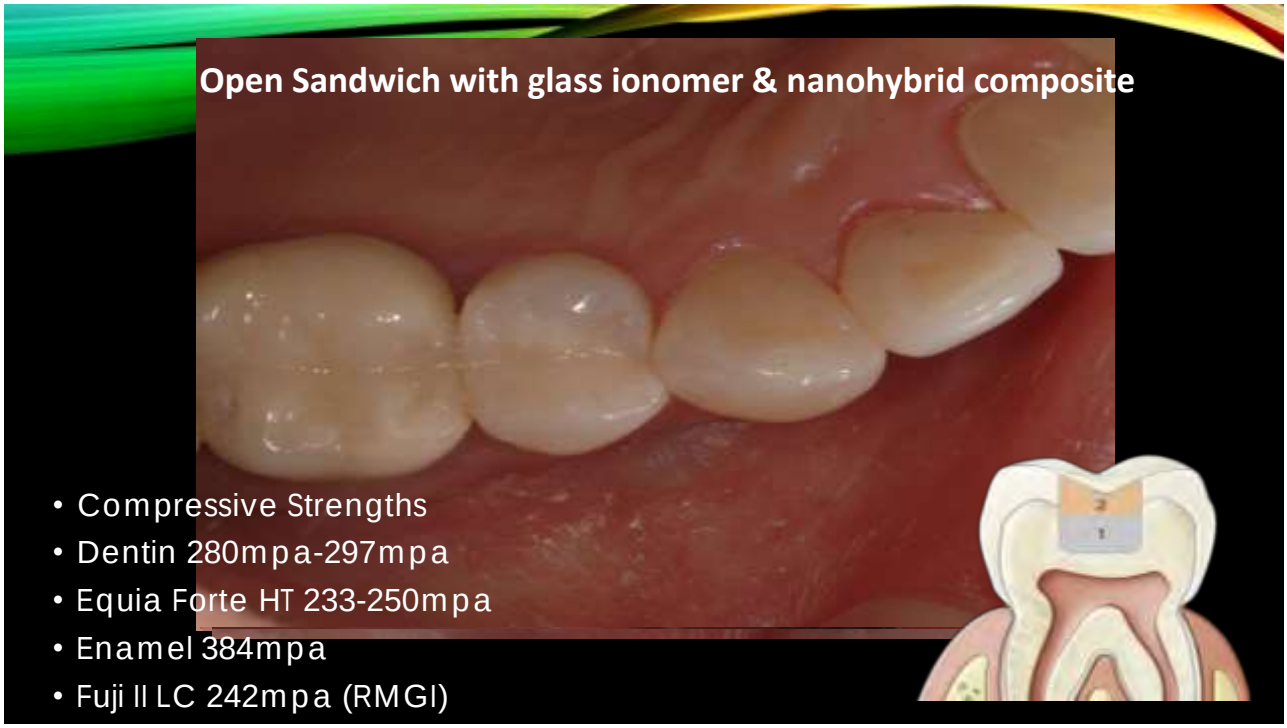
Dentin Replacement with Composite Cap?

- Dentin substitute
  - Flowable Resins
    - -3%-6% vol. shrinkage
    - -1.6-3mpa shrinkage stress
    - -What bonding agent?
  - Glass Ionomers
- Enamel Replacement
  - Modern Composite

ADA reports flowable resins are used by 82% of dentists as bases or liners.

160

Open Sandwich with glass ionomer & nanohybrid composite



- Compressive Strengths
- Dentin 280mpa-297mpa
- Equia Forte HT 233-250mpa
- Enamel 384mpa
- Fuji II LC 242mpa (RMGI)

161

GLASS IONOMER VS. OPEN SANDWICH

162

GLASS IONOMER VS. OPEN SANDWICH

- 10 years later.

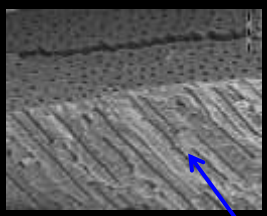
163

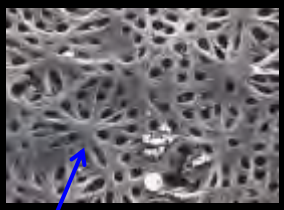
ONE MATERIAL EVERYWHERE?

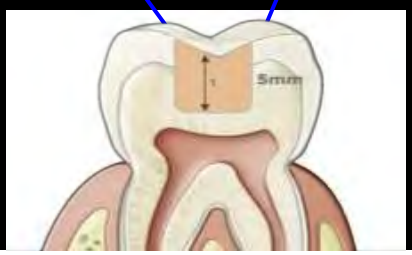
164

Deep Preparations

- Bonding Agent, Flowable & a Layered NanoHybrid Composite
- Conventional Glass Ionomer, Bonding Agent & then Composite







- Fluoride Release
- High compressive strength
- Hydrophillic
- Insoluble
- True chemical adhesion
- Minimizes microleakage
- No sensitivity
- Acid Base Resistant Zone
- Decreased gap formation & C Factor
- Coefficient thermal expansion similar to dentin

165

Why Glass Ionomers?

- Bioactive material
  - affinity to tooth structure. when placing a glass ionomer a weak acid or conditioner is used to aid in releasing calcium and phosphate ions from the tooth structure. These calcium and phosphate ions combine into the surface layer of the glass ionomer and form an intermediate layer called the interdiffusion zone. This bond layer can be very strong and significantly reduce the microleakage that would occur at the margins of the restoration.
- Very good fluoride and ion release helps remineralize tooth structure in the remineralization–demineralization process that naturally occurs in the oral cavity.
- They chemically bond to enamel and dentin.

166

Why Glass Ionomers?

- They produce good marginal integrity.
- They shrink only one ninth the amount of composite material.
- They are fluoride-rechargeable.
- There are no free monomers in the material.
- The cavity preparation can be bulk-filled, making the materials easy to place.
- They exhibit excellent biocompatibility.

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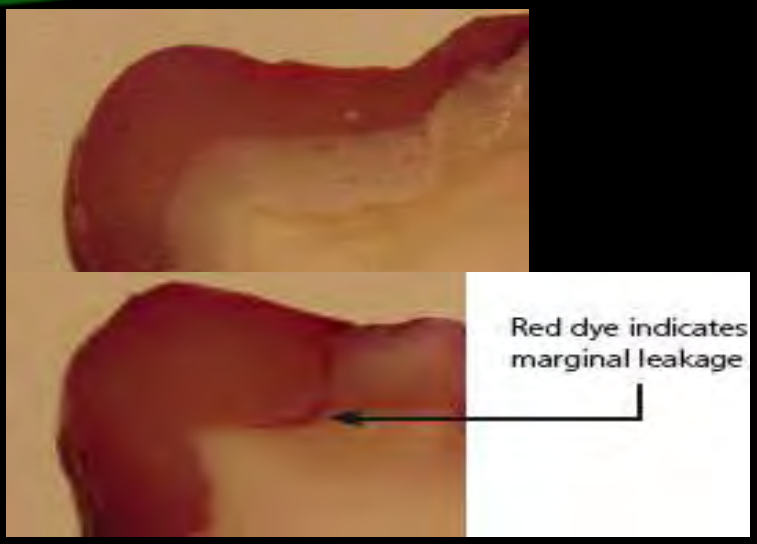
GLASS IONOMER SANDWICH



- Class I, II, III & V posterior restorations
- Open & Closed Sandwich techniques
- Composite replacement
- Amalgam replacement
- High caries risk patients
- Pediatric patients
- Geriatric patients
- Special needs patients
- Long term resistance to microleakage

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microleakage testing in vitro using three different bases under composites

T. DUONG, L. TRAN, R. PERRY , G. KUGEL, *Special Issues of the Journal of Dental Research*. ABSTRACT #0366
> *Tufts University School of Dental Medicine, Boston, MA, USA.*

abstract:

Objective: To compare Class II microleakage in vitro of three different bases placed under composite restorations.

Methods: Thirty-six extracted molars were prepared as Class II MO/DO: 2mm occlusal depth, 2mm axial box depth, 3-5mm gingival box width, and 1mm gingival margin below CEJ. Teeth were randomly divided into three groups of twelve (groups 1-2 = glass ionomer; group 3 = flowable resin): Group 1-Riva Light Cure GI (SDI), Group 2-Riva Self Cure GI (SDI), Group 3-Esthet-X Flow (DENTSPLY Caulk). All groups were primed with Clearfil SE Bond Primer and Bond (Kuraray). All samples were then restored using ICE nano-hybrid Composite (SDI), finished and polished. Restorations were thermocycled for 300 cycles between 5°C and 55°C with a dwell of 30 seconds, and then placed in 0.5% aqueous basic fuchsin dye for 24 hours at 37°C. Samples were sectioned mesiodistally and scored independently by two evaluators for microleakage at the occlusal-cavo and proximal-cavo surfaces under a 40x stereomicroscope. Dye penetration was evaluated using a scoring system: 0 = no penetration, 1 = penetration in enamel/cementum, 2 = penetration at the axial wall, 3 = penetration beyond the axial wall.

Results: A Kruskal-Wallis test revealed no statistically significant difference in microleakage between the three groups at the occlusal-cavo surface ($p>0.05$). Group 3 was found statistically different at the proximal-cavo surface. Group 3 yielded the most microleakage at both interfaces while Group 2 showed no axial wall penetration at either interface.

Conclusion: Both light-cured and self-cured glass ionomers were more resistant to microleakage than a flowable resin on both occlusal-cavo and proximal-cavo surfaces.

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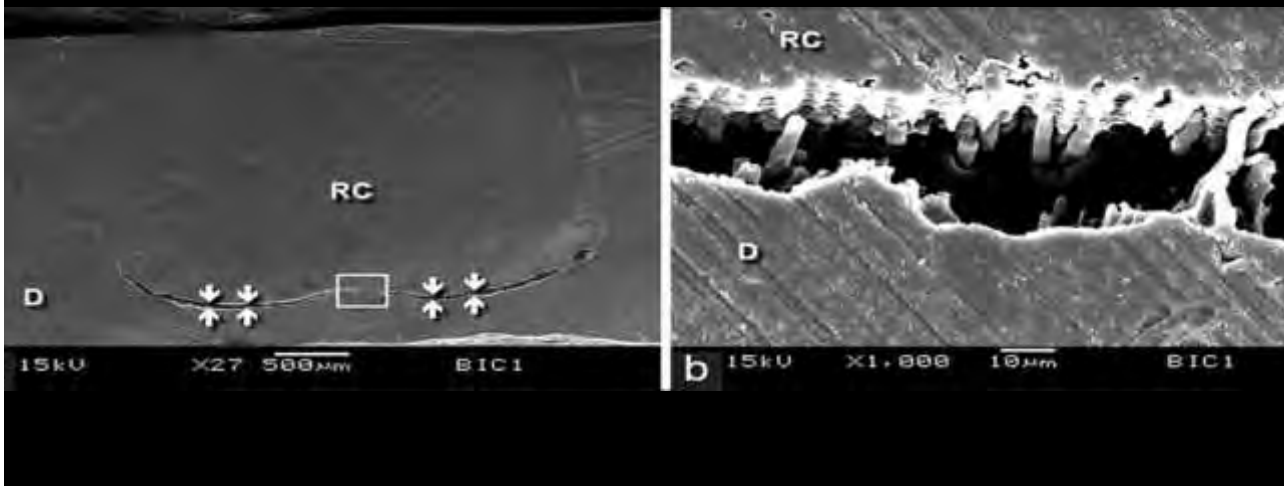
RESIN TO DENTIN HYBRID ZONE



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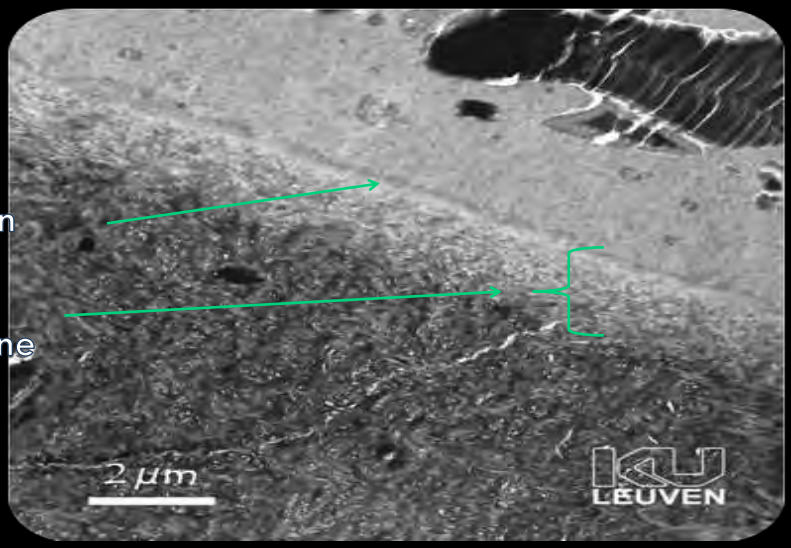
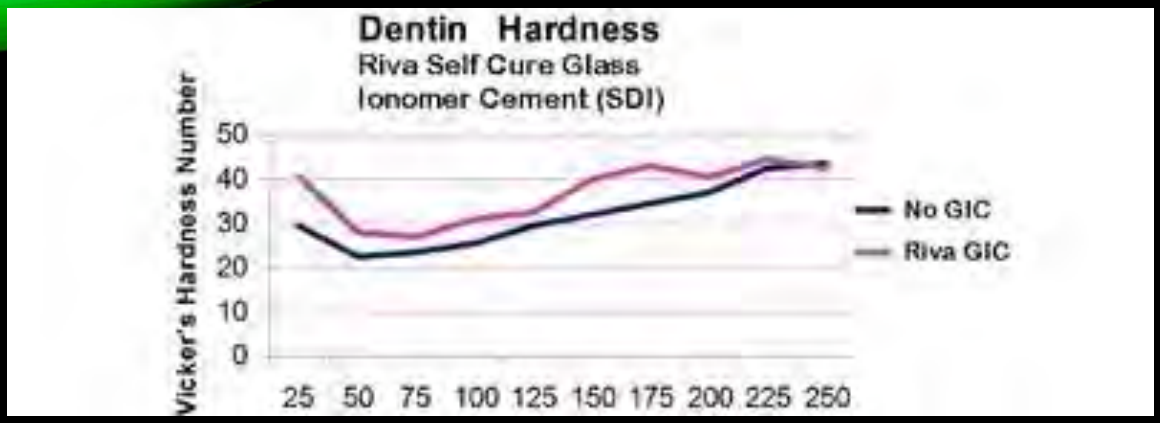
GLASS IONOMER INTERFACE



CARDOSO et al. J Dent 2010

171



BENEFITS OF A BIOACTIVE MATERIAL CONTACTING THE DENTIN

172

Open Sandwich with glass ionomer & nanohybrid composite

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When dentin is missing, use conventional glass ionomers to replace it. It is the best dental material available today that virtually mimics dentin. No adhesive is required, and sensitivity is non-existent. Like dentin, conventional glass ionomers have a very high compressive strength, ensuring it will withstand long term mastication forces.

174

Gordon J. Christensen
Reprint
Clinicians Report
Reprinted July 2020, with permission, from Volume 13 Issue 7, July 2020, Pages 1, 4 & 5
CR is the original and only independent dental product testing organization with funding only from dentists!

A New Look at an Old Idea

Gordon's Clinical Observations: The glass ionomers (GIs) of today are not like the ones of yesterday. Clinicians have been laminating GIs and composite resins for over 20 years, and why not? GIs are self-etching, maintain a sealed, consistent bond interface on dentin over time, and provide a direct source of fluoride to protect areas of the root caries. They have improved properties, like further translucency, faster set times, and greater strength. They deserve strong consideration by clinicians.

Even though 91% of the dentists CR surveyed said that they used glass ionomers (GIs) and RMGIs (up 25% from 2015), most of the time they limited their application to geriatrics, pediatrics, the cervical third, and patients who had active caries.

Common complaints about GIs were weak bond strength, low wear resistance, difficult handling, and limited shade options. However, if the idea is to create a restoration with clean margins that stay sealed and intact for the long term, the glass-ionomer laminate or "sandwich technique" offers some of the best chances for success.

In the following report, we review this often overlooked technique and provide yet one more critical reason as to why you should re-evaluate the way you look at glass ionomers.

The Sandwich Technique

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Dispelling Common Misconceptions about Glass Ionomers

1. GIs don't bond well to tooth substrate or composite resin.

To Dentin: TRUE. Values are only one third as strong as we see with most resin bonding systems. However, GIs maintain the dentin bond much better over time than do resin adhesives. *(See: Matrix Metalloproteinases—The Margin Killers)*

To Composite Resin Systems: There is a plethora of bond data demonstrating composite resin can be bonded to fully polymerized GI and RMGI substrates samples which were at least 24 hours old. This is significant because GI materials set within minutes, but over the first 24 hours may gain up to 800% in compressive strength. There is a direct correlation between bond strength and compressive strength.

FIRST LOOK DATA: Only in *Clinicians Report*

CR researchers designed a novel test method to demonstrate bond strength of composite resin to FRESH glass ionomers, as would be experienced clinically. Results showed adequate bond to freshly cured GI and RMGI materials.

2. Glass Ionomers are weak and brittle and should not be used in stress-bearing areas.

As a bulk-fill stand-alone restorative material, yes, GIs should used judiciously *(non-stress-bearing restorations)* as they may break down or wear at much higher rates when compared to resin composites. However, ***as a dentin replacement material under composite resin,*** it acts as a therapeutic restorative material that maintains long-term sealed margins with the esthetics, physical strength, and wear characteristics expected from a traditional composite resin restoration.

3. Glass Ionomers take too long to set up.

GC Fuji IX GP (GC America) takes 2 minutes and 30 seconds from the time it is expressed to the time it hardens. Many of the other GIs tested were under 3:30 minutes. Even with the additional time for hardening, it does not add much time to the total procedure and is well worth the additional benefits gained.

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GLASS IONOMER MATERIALS

- Dentsply-ChemFil Rock Restorative
- SDI-Riva LC, light cure HV, Riva SC, self cure HV
- G.C. America-Fuji II LC, Equia Fil (Fuji IX)
- VOCO-Ionolux, Ionofil Molar AC
- 3M/ESPE-Ketac Nano, Photac Fil Quick, Vitremer, Ketac Molar Quick, Ketac Fil Plus
- Shofu- FX II

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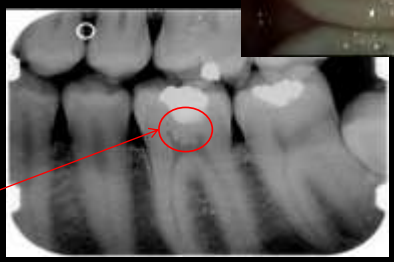
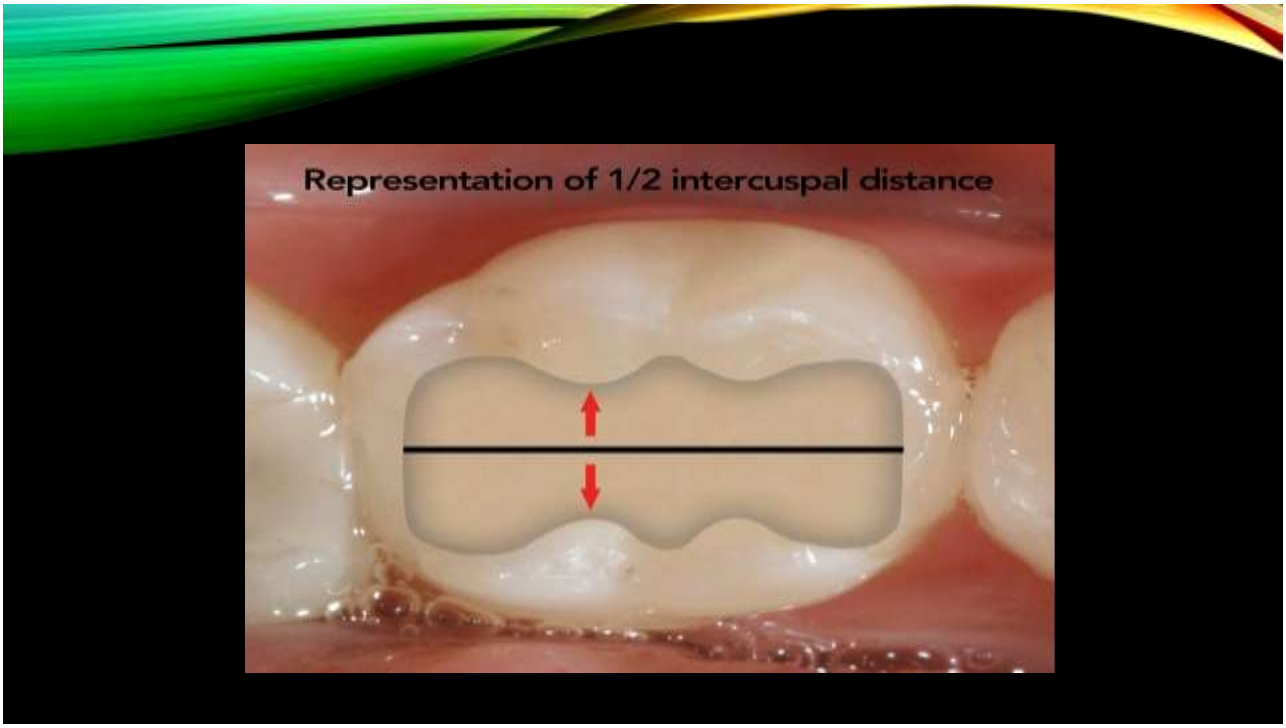
LARGE SIZED LESIONS (>2MM)

- Mostly dentin
- Dentin has more moisture and less substanc
- Open and Closed defects
- Complications & Risks are higher
- Porous, Wet, Dentin Available
- Interproximal concerns
- Increased Occlusal Loading
- Remaining Tooth Structure



Pulpal Proximity

178



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EQUIA FORTE HT

EQUIA FORTE™HT is a complete system that is an ideal solution for posterior restorations:

- *Class I, II, III and V posterior restorations*
- *Composite replacement*
- *Amalgam replacement*
- *High caries risk patients*
- *Pediatric patients*
- *Geriatric patients*
- *Special needs patients*
- *Buildups*
- *Long term provisionals/Emergencies***

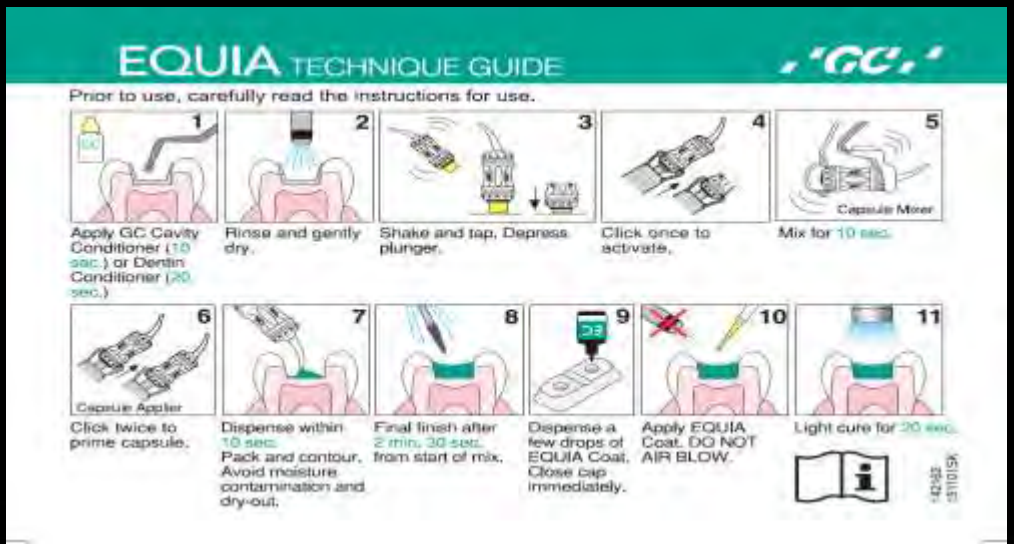
180

EQUIA FORTE HT

Caries control/quadrant dentistry

(Class II, III, V & core buildup)

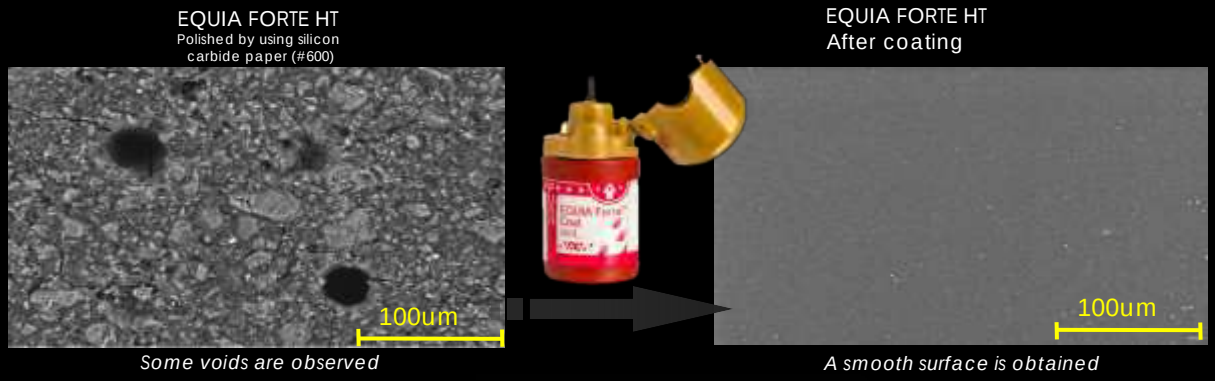
181



182

WHAT DOES EQUIA COAT DO?

Fill porosities to increase physical properties of the restoration and offers a much smoother surface…



183

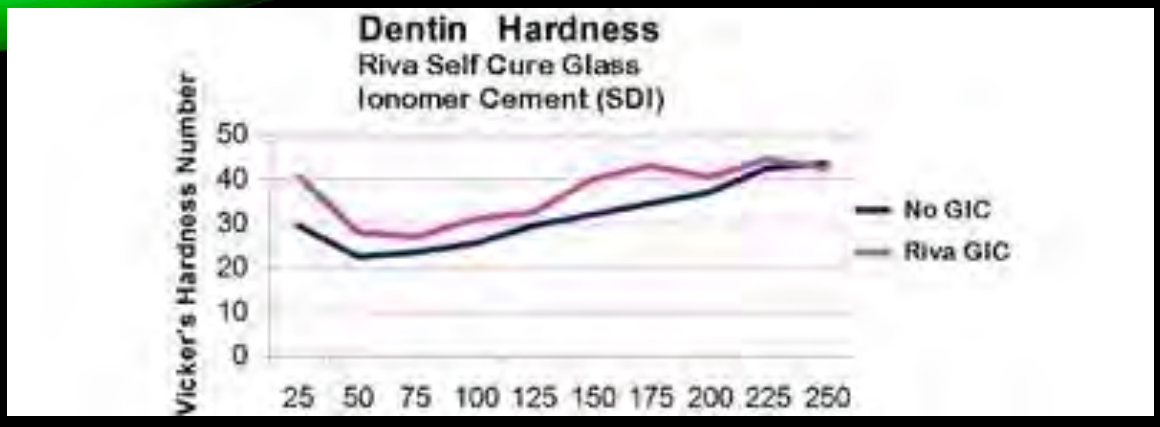
GLASS IONOMER VS. OPEN SANDWICH

184

GLASS IONOMER VS. OPEN SANDWICH

- 10 years later.

185



BENEFITS OF A BIOACTIVE MATERIAL CONTACTING THE DENTIN

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RIVA SC & RIVA SC HV

Conventional Glass Ionomers

187

CONVENTIONAL GLASS IONOMER

Caries control/quadrant dentistry

(Class II, III, V & core buildup)

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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ENDODONTIC SANDWICH TECHNIQUE

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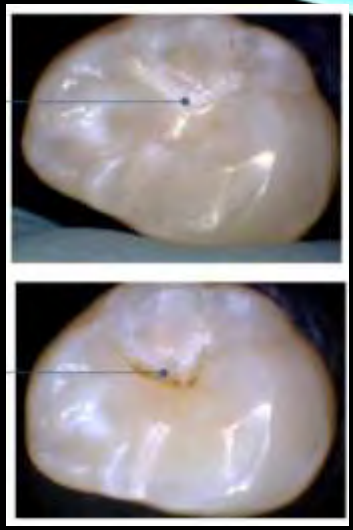
Unseen Failures with Resins.



Consider using Glass Ionomers

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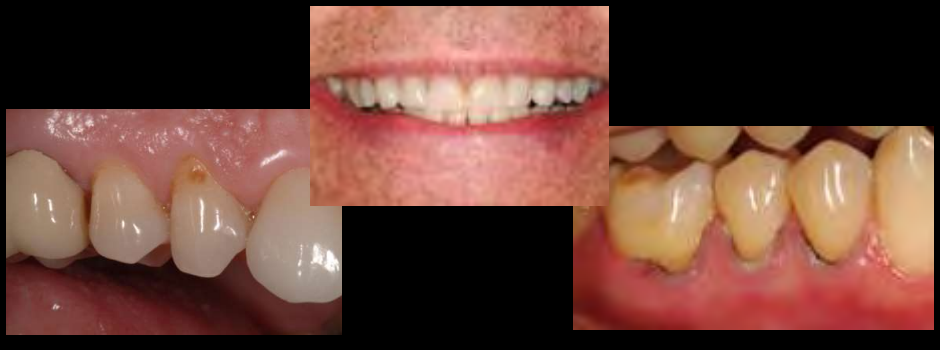
ABFRACTION LESIONS

- Sometimes it presents as single teeth due to excursive interferences or as a **pivot, fulcrum or "teeter totter" tooth.**
- Other times there are more in a quadrant and there is severe wear to the occlusion.
- Other times it maybe on the facials of anterior teeth, where there is wear on the incisal edges or wear facets on the linguals, however little to no wear on posteriors.
- Occlusal guards should be fabricated along with an occlusal analysis in CR on models.



199

Flowables?

200

TYPICAL COMPOSITE BREAKDOWN

Microleakage and missing fillings from high occlusal loads on teeth can cause large cervical stress concentrations resulting in disruption of the bonds between the hydroxyapatite crystals and the eventual loss of cervical enamel and dentin.

201

ABFRACTION LESIONS & CLASS V RESTORATIONS

LATIN WORDS, AB – **"AWAY"**, **FRACTION – "BREAKING"**

- Pathological loss of tooth structure caused by biomechanical loading forces.
- Static and cyclic flexural overloading of tooth structure ultimately leading to fatigue and failure of tooth structure away from the point of loading.

202

Van Meerbeek B, et al. Relationship between bond-strength tests and clinical outcomes. Dent Mater (2009), doi:10.1016/j.dental.2009.11.148

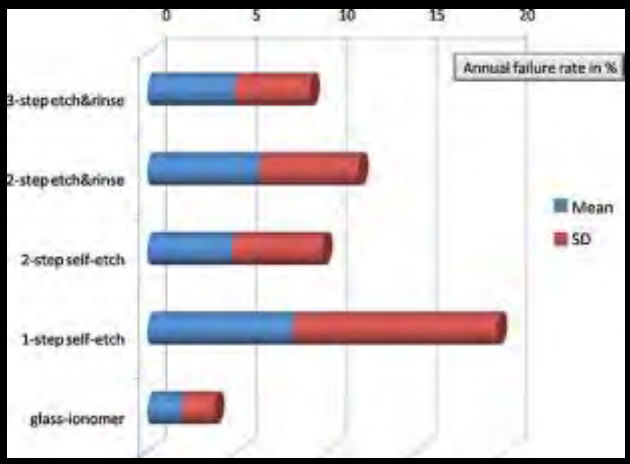


Fig. 15 – Graph representing the mean annual failure rates per adhesive class, determined according to a systematic review of Class-V clinical trials of adhesives during the period 1998–2004 [2].

203

RESIN MODIFIED GLASS IONOMERS (RMGI)

- Light cured
- Dual cured
- High flexural strength
- Lower compressive strength than conventional G.I.
- Good polishability
- Excellent wear
- Hydrophillic
- Fluoride release
- No microleakage
- No adhesives
- Acid resistant layer
- Reduces sensitivity
- True chemical adhesion

204

GC FUJI AUTOMIX LC

205

Replacing Existing Restorations & Decay

- Resin bonding is mostly due to the intertubular dentin.
  - Deep preparations have less intertubular dentin.
  - More moisture present due to odontoblastic tissues and fluid
  - Higher risk of post-op sensitivity
  - *Use a New Advanced Adhesive and Flowable*

- Glass Ionomer (GI)
  - True adhesion to tooth structure
  - Bonds to moist dentin
  - Less technique sensitive
  - Fluoride release
  - Decreased gap formation and cusp deformation
  - Coefficient of thermal expansion is similar to dentin
- No post operative sensitivity
  - Use on dentin & cementum
  - Base out deep areas
  - Place resin/composite on top of GI

Dentin Bond Strengths of Simplified Adhesives: Effect of Dentin Depth. Compendium June 2006, p.340-345
Using Cavity Liners with Direct Posterior Composite Restorations. Compendium June 2006, p.347-351

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RESIN MODIFIED GLASS IONOMER RESTORATION

Post-Op Photo – notice unlike typical class V composite RMGI restorative material.

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TIP

Restorative Therapy- Case

Typical treatment involves the placement of a #00 retraction cord on each tooth followed by a shade selection. Roughen tooth structure with air abrasion. Place cavity conditioner on all areas to be restored for 10 seconds, then wash and dry.

208

Restorative Therapy- Case

Mix RMGI and syringe into place. Utilize hand instruments to shape and remove gross excess. Cure each tooth for 20 seconds. Remove excess and contour using a handpiece with fine diamond burs. Teeth should be isolated from saliva.

209

Restorative Therapy- Case

After contouring the restorations can be coated with a self etch adhesive coating, and cure for 10 seconds.

210

Restorative Therapy- Case

Ten year post-op photos show the integrity of the material is still excellent. Note the lack of marginal microleakage stain often present with composite restorations.

211

RESIN MODIFIED GLASS IONOMER

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RESIN MODIFIED GLASS IONOMER RESTORATION

Post-Op Photo – notice unlike typical class V composite RMGI restorative material.

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RESIN MODIFIED GLASS IONOMER

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riva light cure
ACTIVA kids
ACTIVA BioACTIVE-RESTORATIVE
ACTIVA BioACTIVE-BASE/LINER
ACTIVA BioACTIVE-CEMENT
ceramir
Biodentine
septodont
https://www.oralhealthgroup.com/features/bioactivity-restorative-dentistry-users-guide/

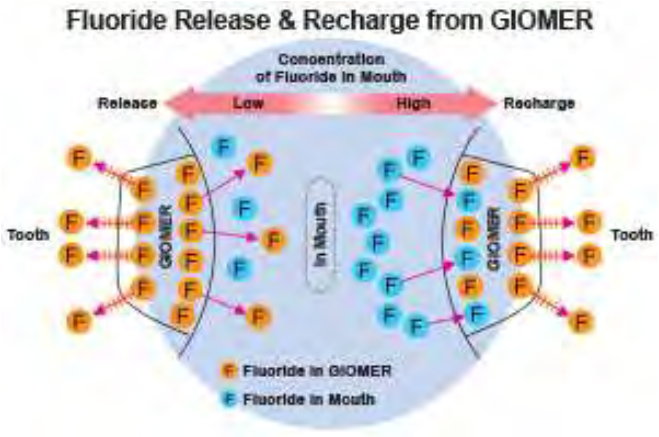
215


since 1922
2022
SHOFU
Bright smiles for another 100 years
BEAUTIFIL Flow Plus X
SHOFU INC.
PRG Technology
Giomer

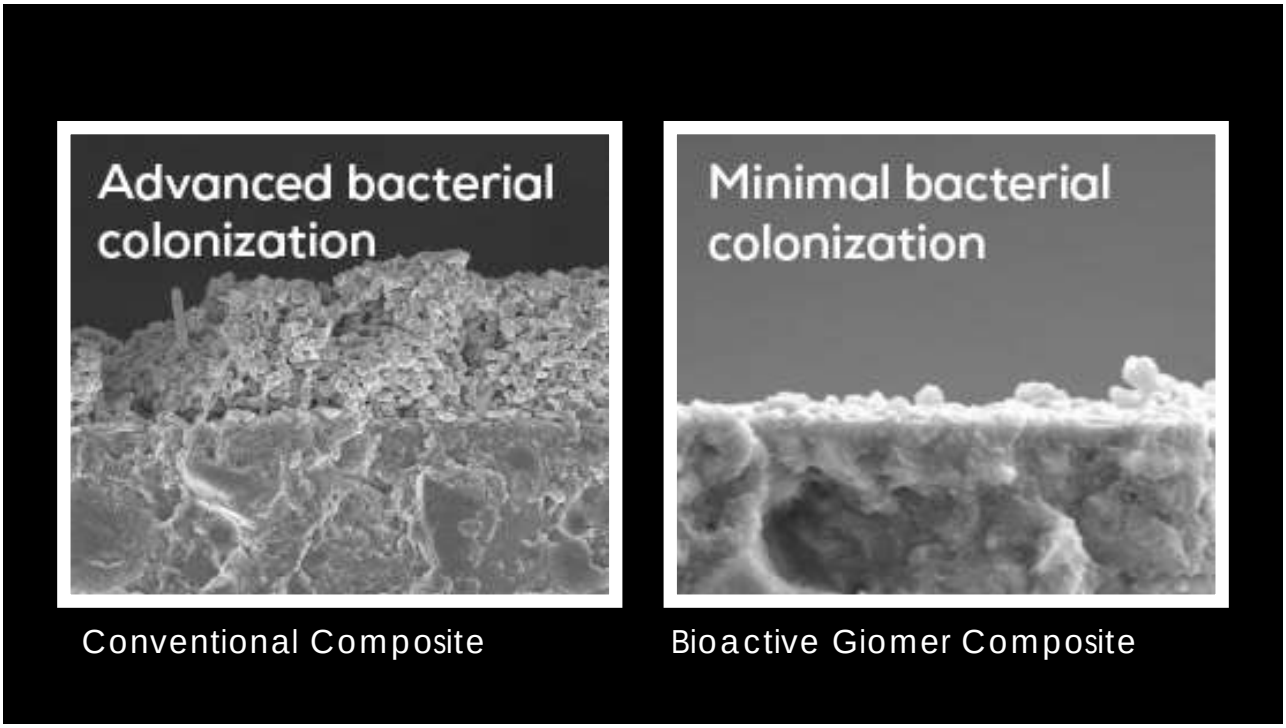
216

- Giomers represent the hybridization of glass ionomer and composite resin properties: the fluoride release and recharge of glass ionomers and the esthetics, physical properties, and handling of composite resins.
- The Giomer concept in based on PRG (Pre-Reacted Glass) technology: a glass core, surrounded by a glass ionomer phase enclosed within a polyacid matrix. Studies show dentin remineralization occurs at the preparation surface adjacent to the giomer.
- Giomers, through the creation of fluoride reservoirs, release and recharge fluoride efficiently, significantly better than compomers and composite resins, although not as well as glass ionomers.

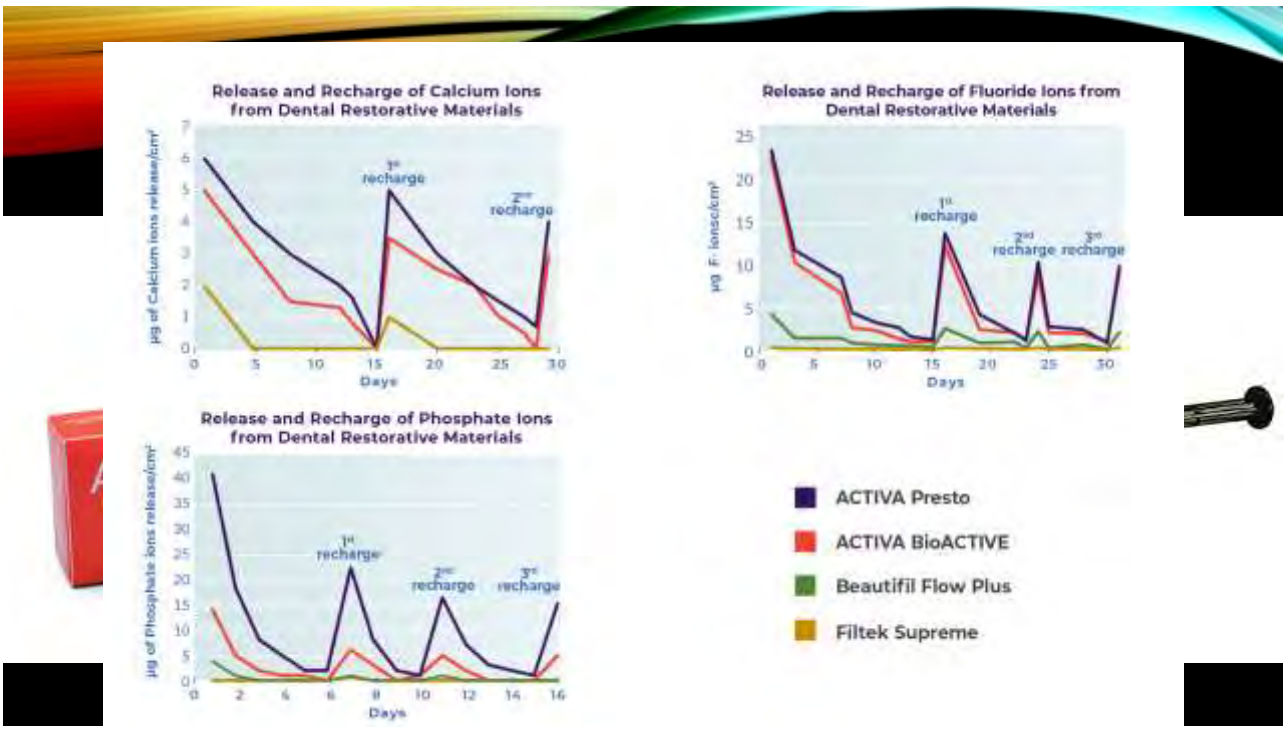
217



218


Advanced bacterial colonization
Minimal bacterial colonization
Conventional Composite
Bioactive Giomer Composite

219


Release and Recharge of Calcium Ions from Dental Restorative Materials
µg of Calcium ions release/cm²
1st recharge
2nd recharge
Days
Release and Recharge of Fluoride Ions from Dental Restorative Materials
µg F- ions/cm²
1st recharge
2nd recharge
3rd recharge
Days
Release and Recharge of Phosphate Ions from Dental Restorative Materials
µg of Phosphate ions release/cm²
1st recharge
2nd recharge
3rd recharge
Days
ACTIVA Presto
ACTIVA BioACTIVE
Beautifil Flow Plus
Filtek Supreme

221

PULPDENT
ACTIVA
IONIC-RESTORATIVE™

Releases/recharges calcium, phosphate and fluoride

222

DO Restoration Tooth #29

223

CLASS V AND CLASS II TOOTH #31

224

Biofilm Challenge and Gap Formation

Specimens are in a 37c Pressurized chamber for 30+ days

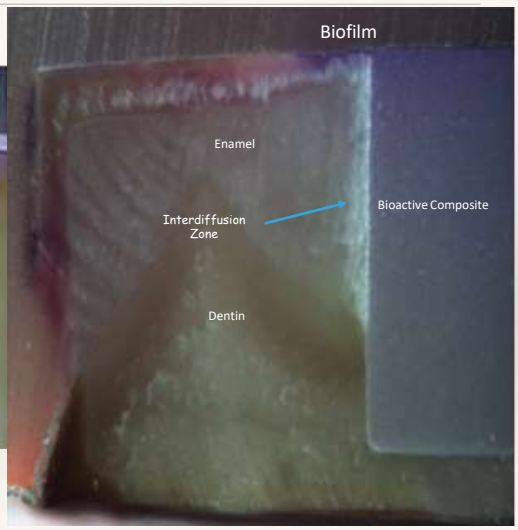
Biofilm is refreshed daily

Results, biofilm can deteriorate margins and composites

Marginal leakage can occur

Demineralizaton of enamel and dentin can occur

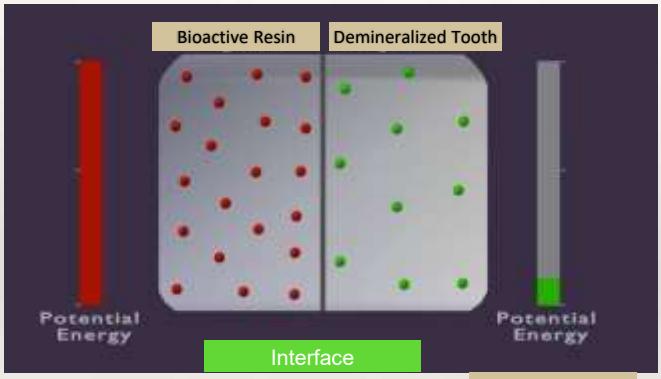
Gap formation will follow interface of restoration



Drs. Ferracane and Hilton, Oregon Health Sciences University

225

Diffusion

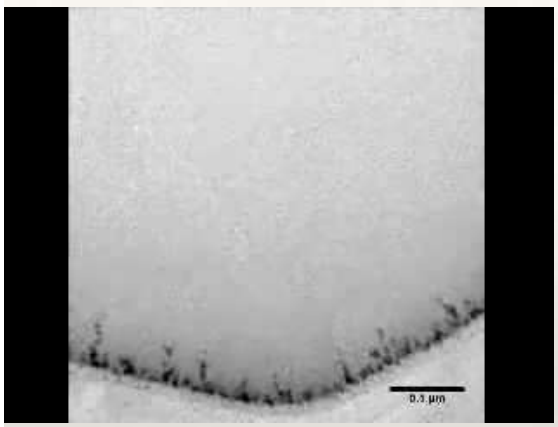


High Concentration Calcium/Phosphate

Lower concentration Calcium/Phosphate

- DIFFUSION IS UNDERSTOOD IN TERMS OF THE TRANSFER OF FREE IONS
- BIOACTIVE HYDROPHILIC RESIN ALLOWS IONS TO PASS THROUGH WITHOUT DEGRADATION
- IONS OF TOOTH AND BIOACTIVE RESIN COME INTO EQUILIBRIUM/BALANCE
- POLYANIONS ENVIRONMENT
- (-C00H/ HPO4-2) WE CREATE A POLYANIONIC ENVIRONMENT TO THE CALCIUM PHOSPHATE

226



NUCLEATION

- POLYANIONS, POLYANIONIC SURFACES SERVE AS AN ORGANIZING MATRIX WHERE PROTEIN-PROTEIN INTERACTIONS OCCUR.
- NUCLEATION IS THE INITIAL PROCESS OF CRYSTALLINE FORMATION
- THE CALCIUM/PHOSPHATE COMPLEX IN BIOACTIVE RESIN SERVES AS NUCLEATION SITES
- THE CONTINUOUS GROWTH OF CRYSTALLINE STRUCTURES CONSTITUTES BIOMINERALIZATION

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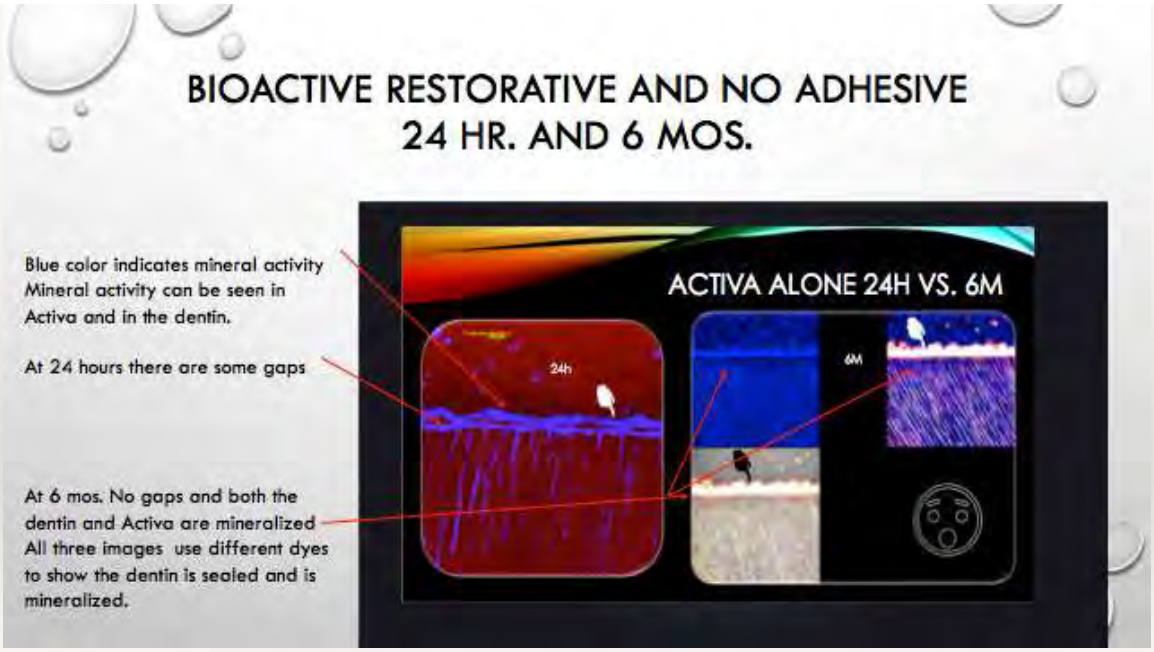

Professor Salvatore Sauro, Valencia Spain

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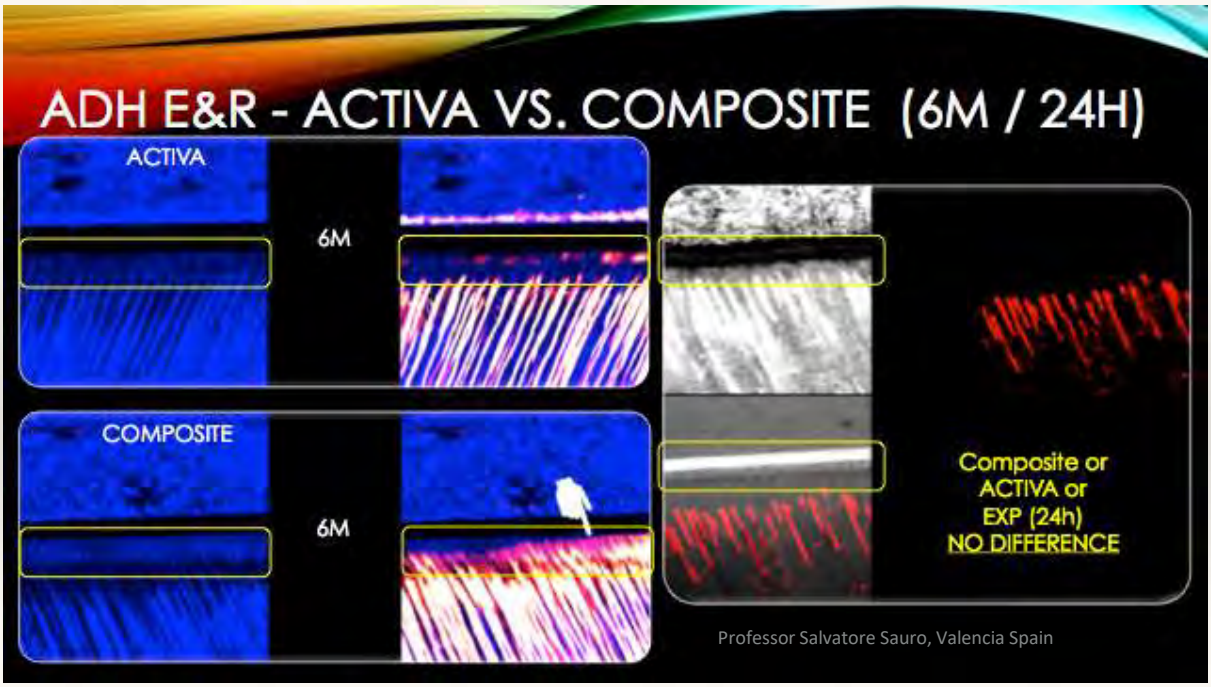

Professor Salvatore Sauro, Valencia Spain

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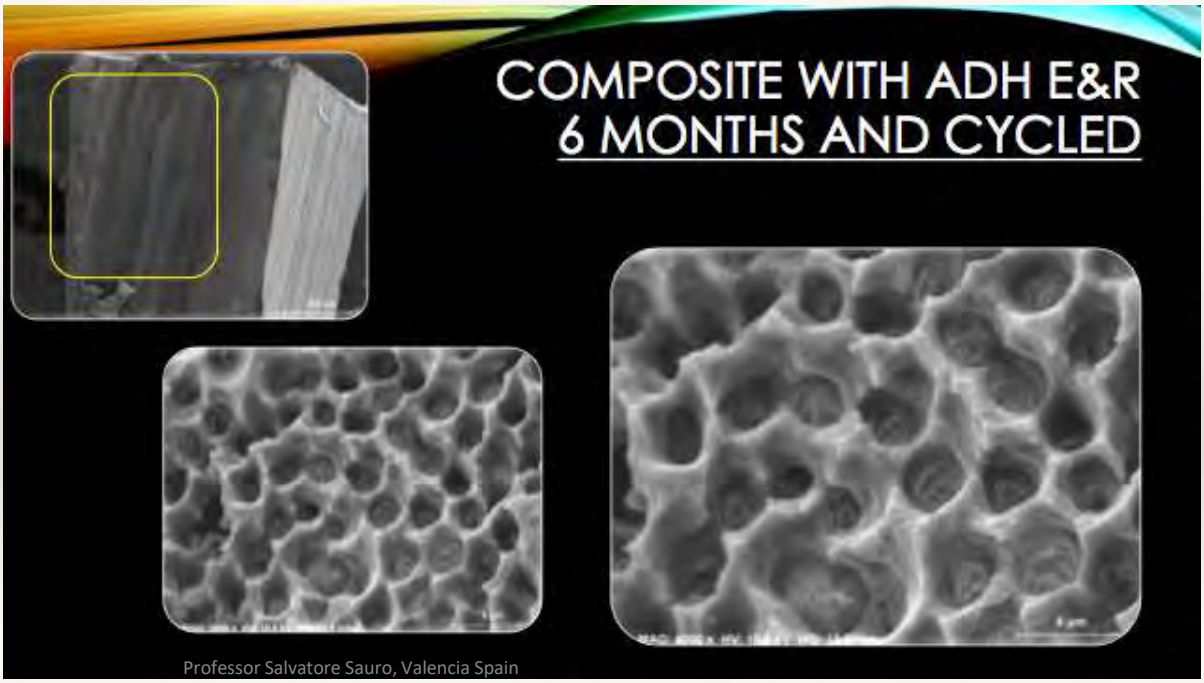
COMPOSITE WITH ADH E&R
6 MONTHS AND CYCLED
Professor Salvatore Sauro, Valencia Spain

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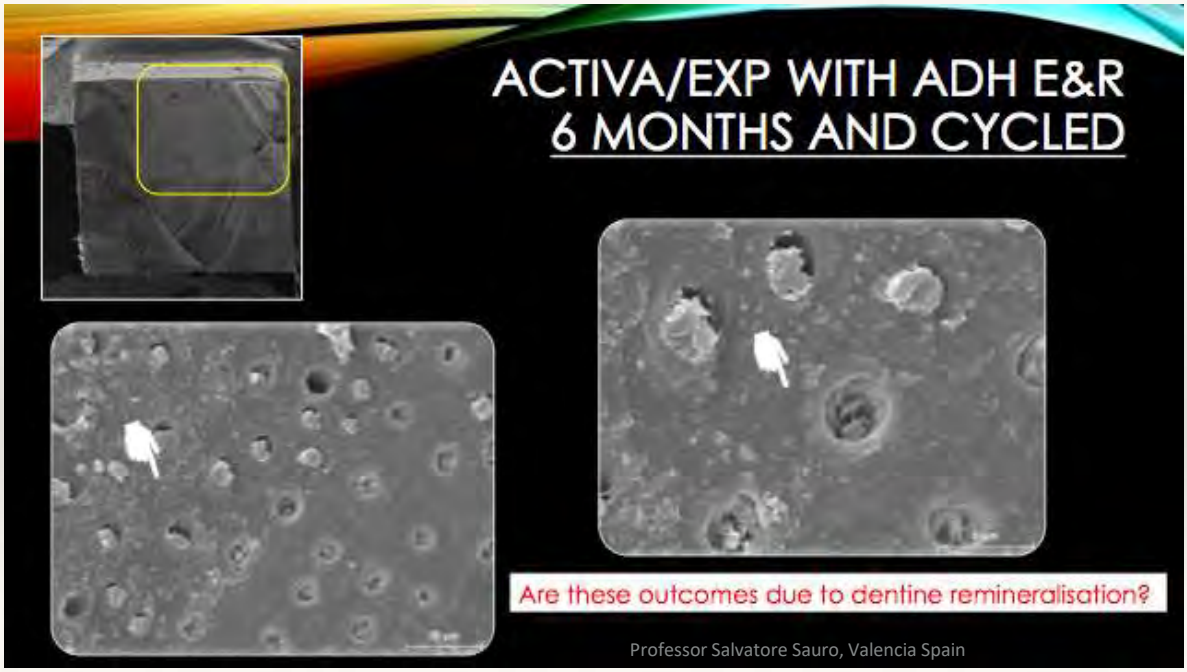
ACTIVA/EXP WITH ADH E&R
6 MONTHS AND CYCLED
Are these outcomes due to dentine remineralisation?
Professor Salvatore Sauro, Valencia Spain

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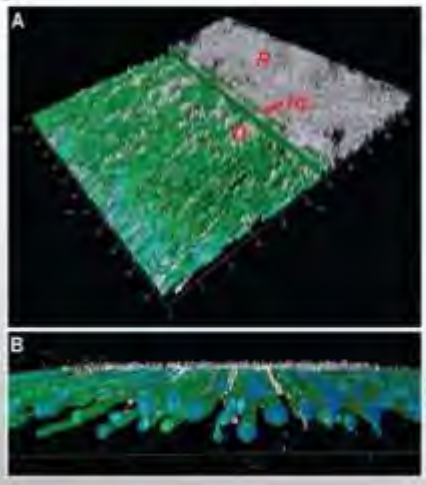
POPULAR ADHESIVE AND ENZYMATIC ACTIVITY



In situ zymogramic views of dentin, hybrid, and adhesive layer showing the endogenous enzymatic activity. (A) Tridimensional model of the acquired image in the green channel of the multiphoton confocal microscope superposed on images obtained with differential interference contrast showing intense fluorescence, produced by gelatin hydrolysis and expression of MMP activity, throughout the entire extension of the hybrid layer created with Scotchbond 1 XT (3M ESPE).
J Dent Res. 2015 Feb; 94(2): 241–251.

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BIOACTIVE RESTORATIVES AND MMP'S AT TIME 0

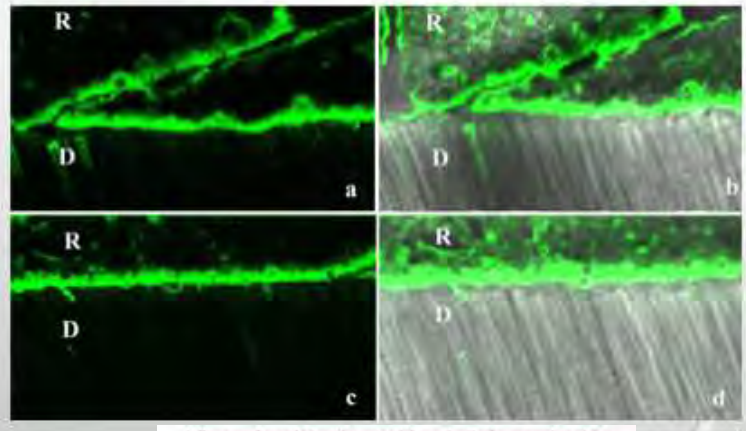

Figure 2. Resin-bonded dentin interfaces prepared with Activa Restorative, incubated with quenched fluorescein-labeled gelatin. D = Dentin; HL = Hybrid Layer; R = Restorative Material. **(a,c)** Images acquired in green channel showing fluorescence of the samples. **(b,d)** Image acquired as optical microscope showing the morphology of the sample.

Influence of novel bioactive materials on dentinal enzymatic activity

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BIOACTIVE RESTORATIVES AND MMP'S AT 1 MONTH

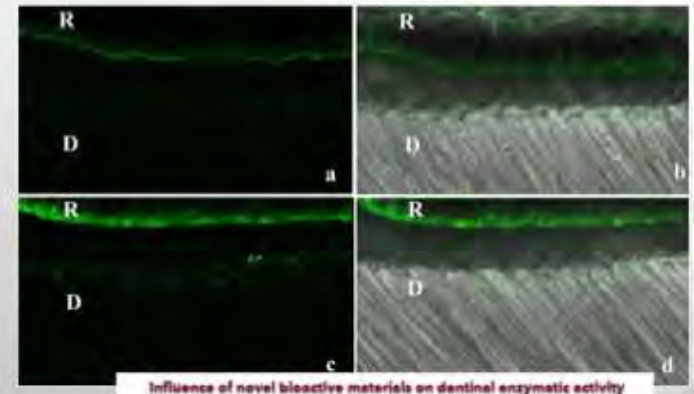

Figure 4. Resin-bonded dentin interfaces of 1-month-aged samples prepared with Activa Restorative, incubated with quenched fluorescein-labeled gelatin. D = Dentin; HL = Hybrid Layer; R = Restorative Material. **(a,c)** Images acquired in green channel showing fluorescence of the samples. **(b,d)** Image acquired as optical microscope showing the morphology of the sample.

Influence of novel bioactive materials on dentinal enzymatic activity

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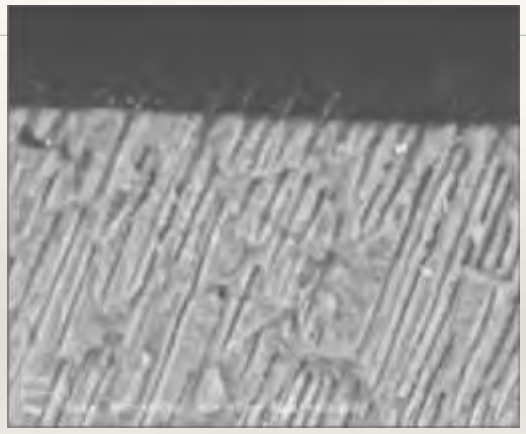
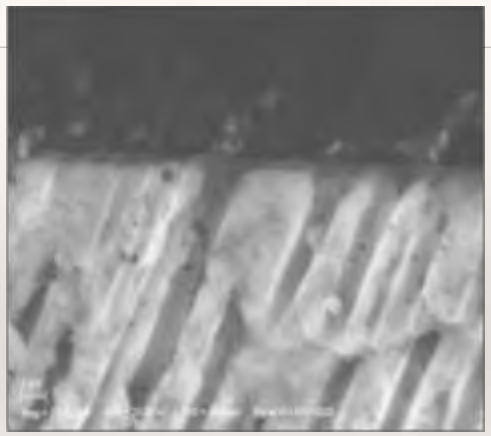
Resin Tags as Nucleation Sites





- Hydrophilic resin penetrates dentin and acts as nucleation sites for apatite formation. Dr. Franklin Garcia-Gadoy

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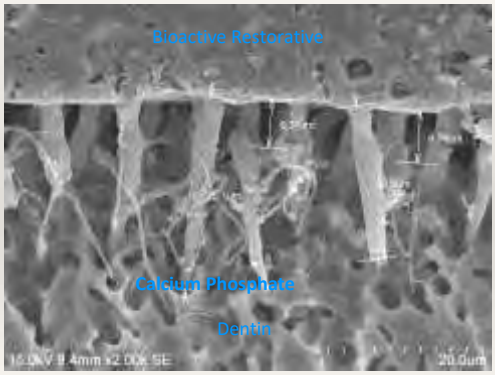
Resin tags acting as nucleation sites



Bioactive Restorative Material to Dentin

B. Harper, H. Hamama, P. Neelekantan: Hong Kong University

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PULPDENT
ACTIVA BIOACTIVE IONIC-RESTORATIVE™

Releases/recharges calcium, phosphate and fluoride

237

Cavities, Old Composite Replacements, Undercut Block Out

- Bioactive flowable
- Releases Calcium, Fluoride, Phosphate ions
- Highly fracture and wear resistant
- BPA & Bis-GMA free
- Highly radiopaque
- 8 Shades A1-3.5, A4, A6, B1, BW

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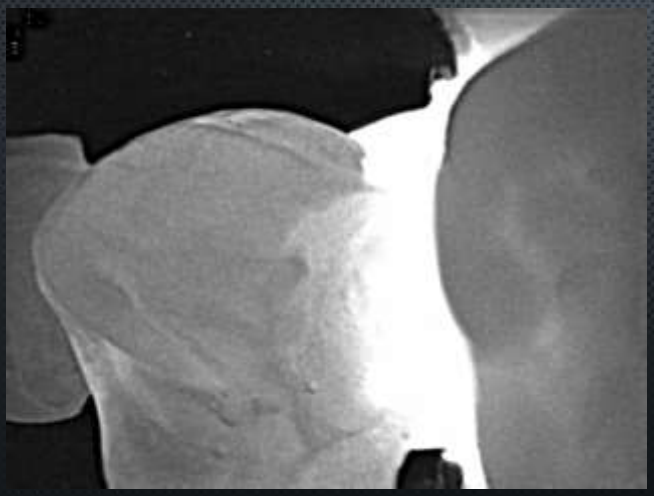
FIND THE LESION?



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DO YOU SEE THE PROBLEM?

240

HOW MANY OF THESE DO WE MISS AS DENTISTS?

241

MORE CONSERVATIVE RESTORATIONS

242

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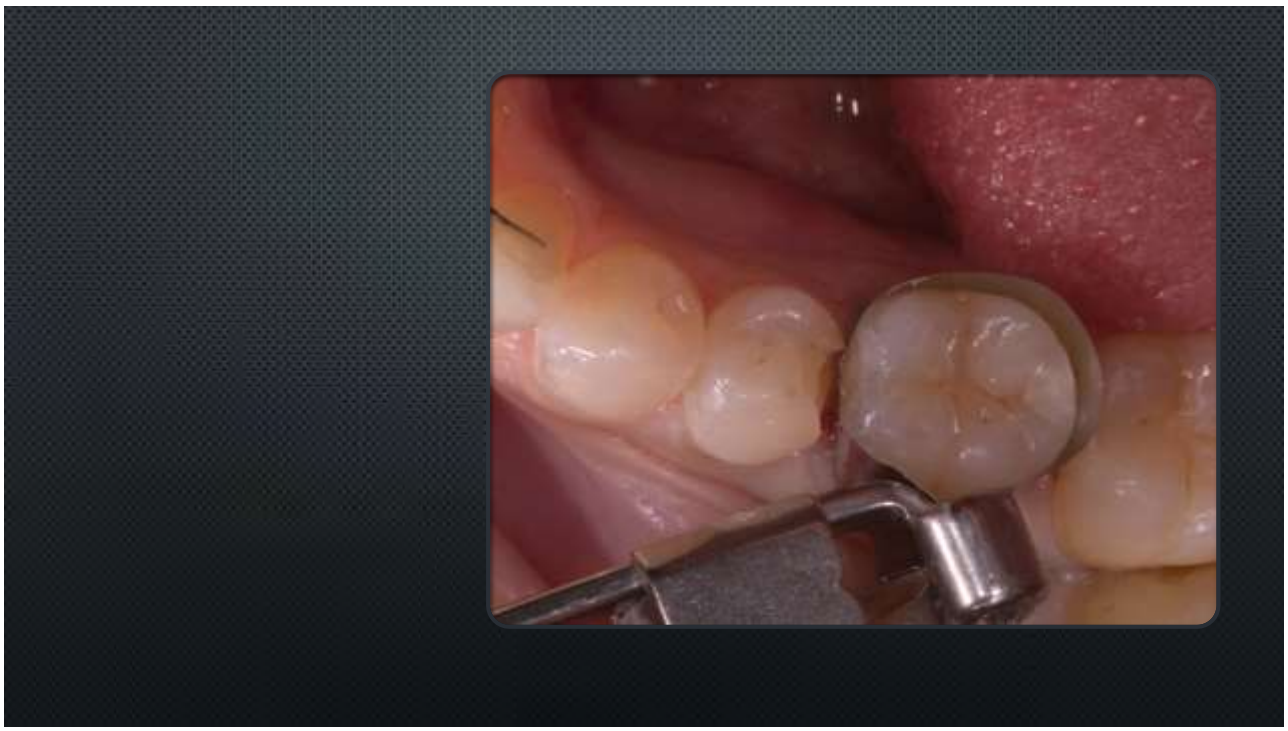
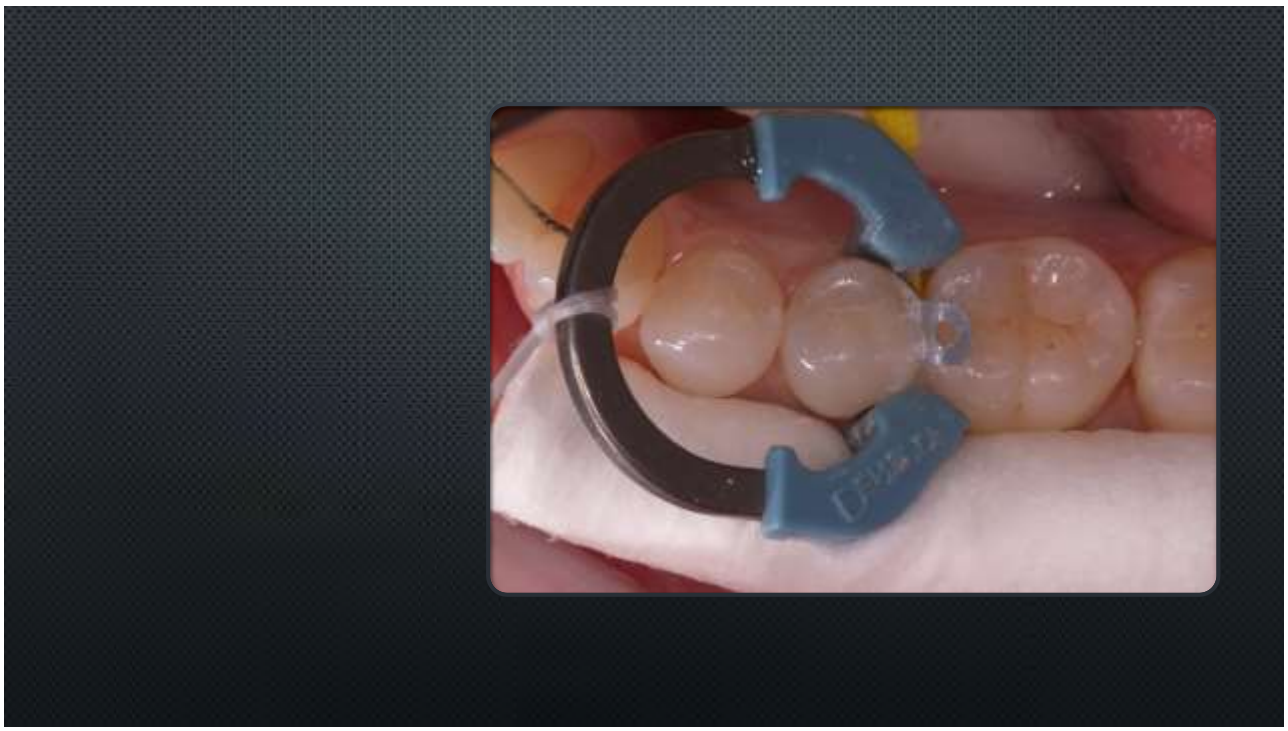


245

246



247

V3RING

NiTi only spring

Anatomically shaped tines

Built in lip for increased stability in forceps

V-Shaped glass reinforced autoclavable plastic tines (leaves room for the wedge)

248

PALODENT PLUS-DENTSPLY

Identical except for color

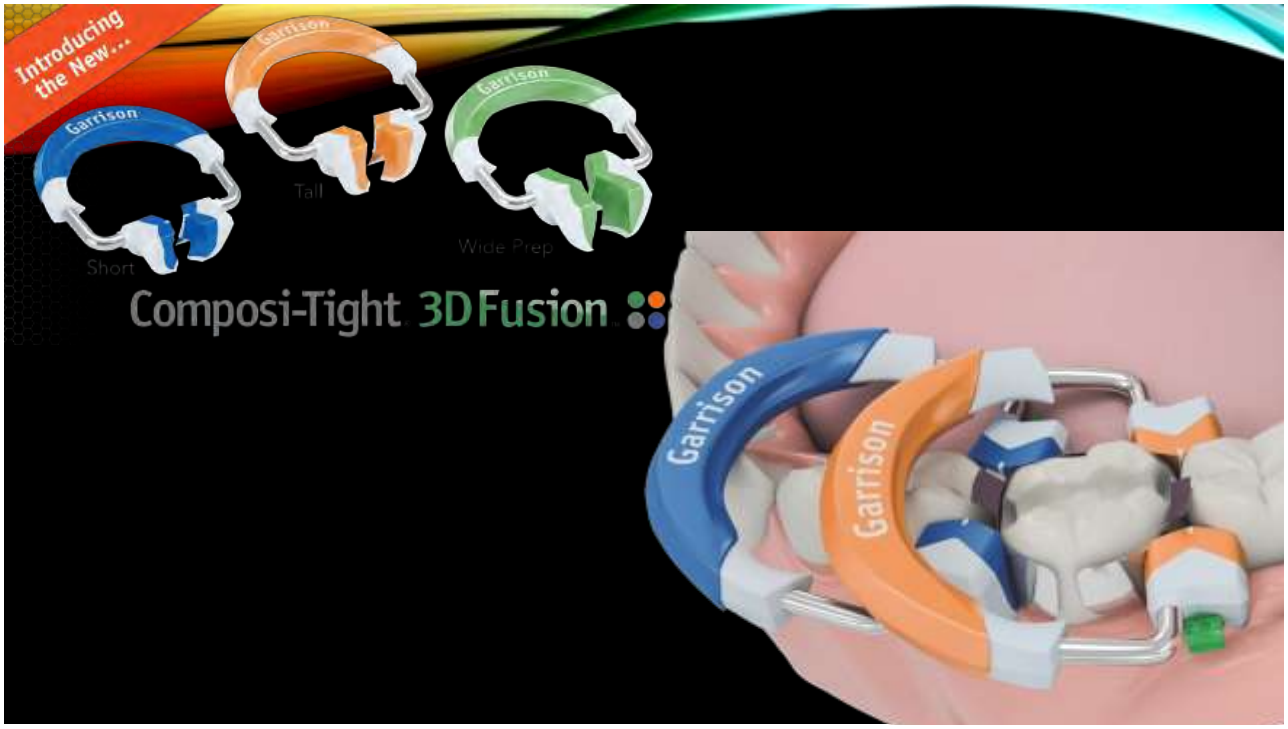
249

CLINICIAN'S CHOICE

250

Garrison Dental 3D Ring System

251


Introducing the New...
Garrison
Short
Garrison
Tall
Garrison
Wide Prep
Composi-Tight 3D Fusion
Garrison
Garrison

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THERACAL LC (BISCO)

TheraCal LC®
TheraCal LC is a light-cured, resin-modified calcium silicate. Its unique apatite stimulating ability makes it ideal for direct and indirect pulp capping and as a protective liner.

256

Open Sandwich with glass ionomer & nanohybrid composite

257

THERACAL LC (BISCO)

- Calcium release stimulates[1]* hydroxyapatite and secondary dentin bridge formation[2,3]
- Alkaline pH promotes healing and apatite formation[2,4]
- Significant calcium release[1] leads to protective seal[5,7,8]
- Protects and insulates the pulp[5,6]
- Moisture tolerant[1] and radiopaque – can be placed under restorative materials and cements

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- Alkaline pH 8.5
- Moisture Tolerant
- Self Sealing
- Apatite Formation
- Insoluble/No Degredation
- Stronger with time
- Semi / Translucent
- Biocompatibility-Excellent
- Bioactivity-Apatite formation
- No silane, conditioning, bonding

Calcium Aluminate/Glass Ionomer Hybrid Cement**

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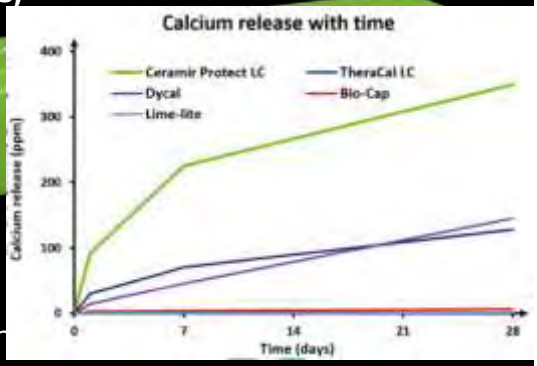
CERAMIR PROTECT LC (DOXA)

•Direct pulp capping for any pulpal exposures, including:
•Carious pulp exposure
•Mechanical pulp exposure
•Pulp exposure due to trauma



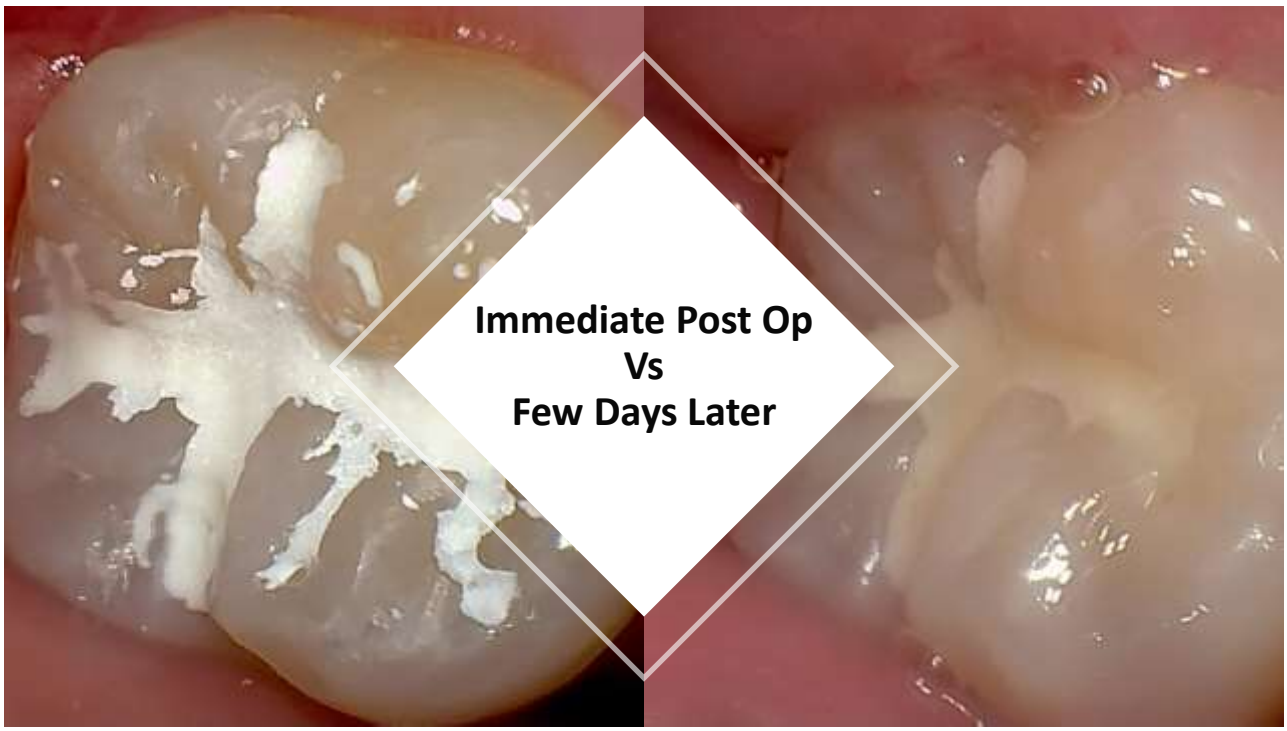
Indirect pulp capping in deep preparations:
- Under amalgam restorations
•Under Class I and Class II composite restoration
•Under cements
•As an alternative to calcium hydroxide

https://www.ceramirdental.com/ceramir-protect-lc-syringe.html

260


Bioactive
Biocompatible
Restorative
Material
ceramir
RESTORE
QUIKCAP
capsule
innovation

261


Immediate Post Op
Vs
Few Days Later

262

Doxa

263

CLASS V - RESTORATIONS

Doxa

264

Class V Restorations
-subgingival
-deep restoration
-moisture control

Doxa

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CLASS V - RESTORATIONS

Doxa

266

Class I, II & III: Non-Load Bearing Restorations

Doxa

267

Class I, II & III Non-Load Bearing Restorations

Doxa

268

Wedge Guards (TrioDent /Ultradent)

Doxa

269

FenderWedges (Garrison Dental)

Doxa

270

Fendermate (Directa Dental)

Doxa

271

Class I, II & III Non-Load Bearing Restorations

Doxa

272

Class I, II & III Non-Load Bearing Restorations

Doxa

273

Class I, II & III Non-Load Bearing Restorations

Doxa

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Ceramir Restore Review

- Easy (No etchants or adhesives)
- Fast & Consistent
- Hydrophilic
- No post op sensitivity
- Biocompatible
- Bioactive
- Natural Integration and REPAIR of the Tooth

Doxa

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EVERX FLOW

GC America

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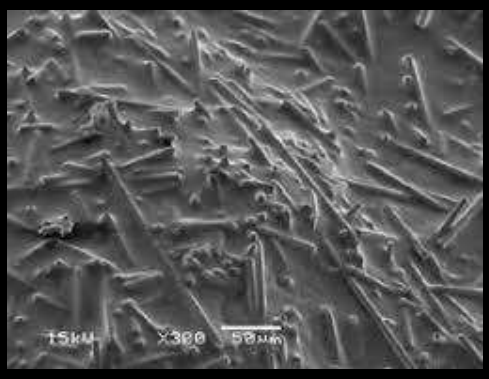
EVERX FLOW

GC America

- Short fiber reinforced injectable composite
- Reduces crack propagation
- Perfect thixotropy for easy placement and adaptation
- No slumping
- Indicated for dentin replacement in bulk-filling and core build-up applications or in cases of weakened/cracked tooth structure, together with conventional composite as an enamel layer



278

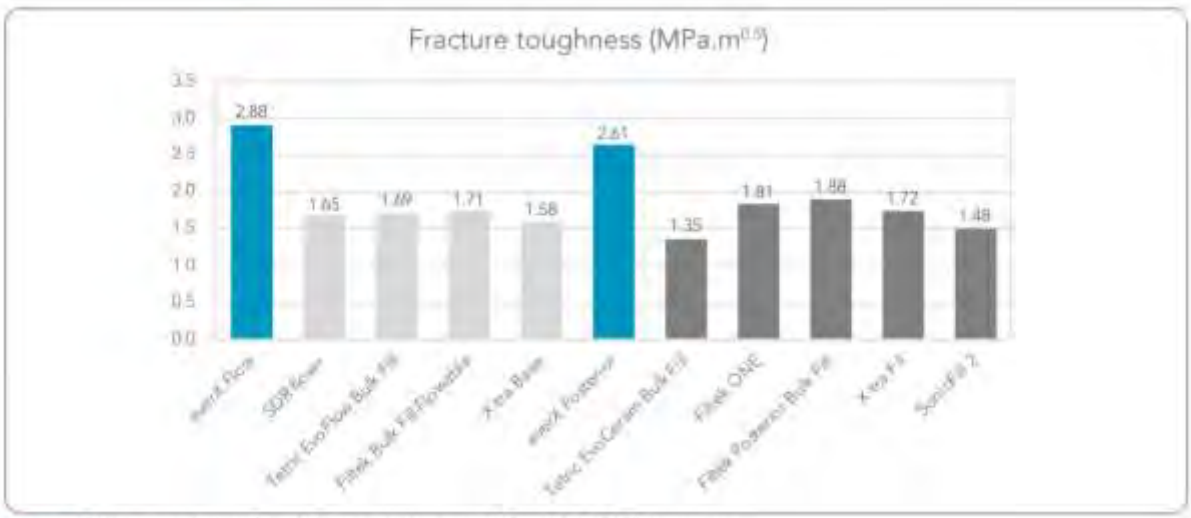


Figure 8: Fracture toughness of everX Flow and other paste & flowable bulk-fill composites.
Source: GCC R&D, Japan, 2018. Test method: as per ASTM E399-90 (1997). Data on file.

279

These superior results were confirmed by the University of Turku when testing the fracture toughness of everX Flow against other flowable bulk materials. **everX Flow achieved a fracture toughness about double that of all other products tested.**

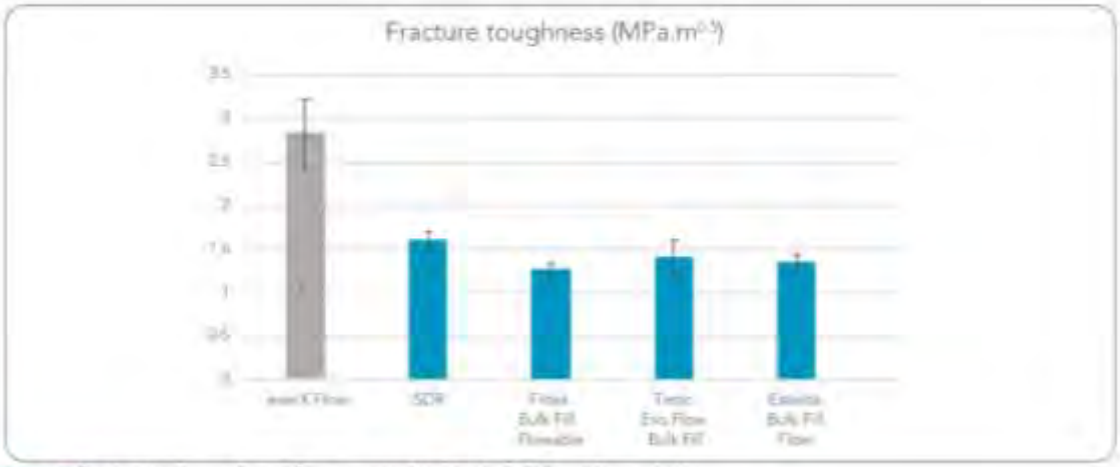


Figure 9: Fracture toughness of everX Flow compared to other bulk-fill flowable composites.
Source: Characterization of a new fibre-reinforced flowable composite, Lassila et al. Odontology, 2018
The same letters inside the bars represent non-statistically significant differences (p>0.05) among the groups.

280

The same behaviour was also observed by GC R&D when performing fracture toughness tests:

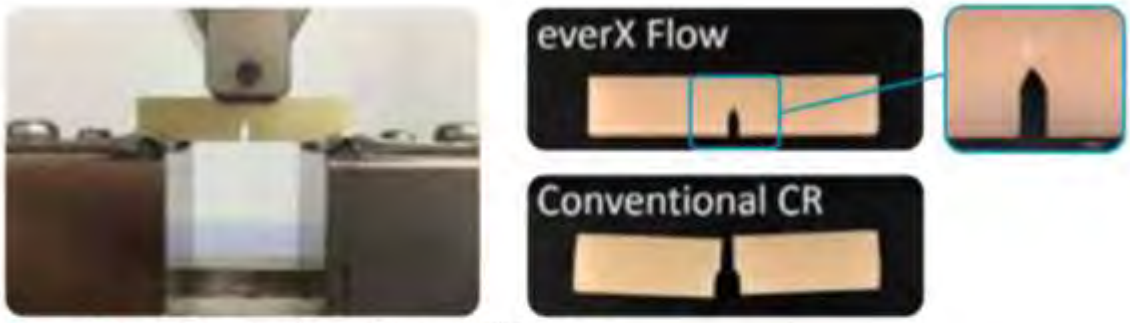


Figure 12: everX Flow sample arresting crack propagation
Source: GC R&D, Japan, 2019. Data on file.

281

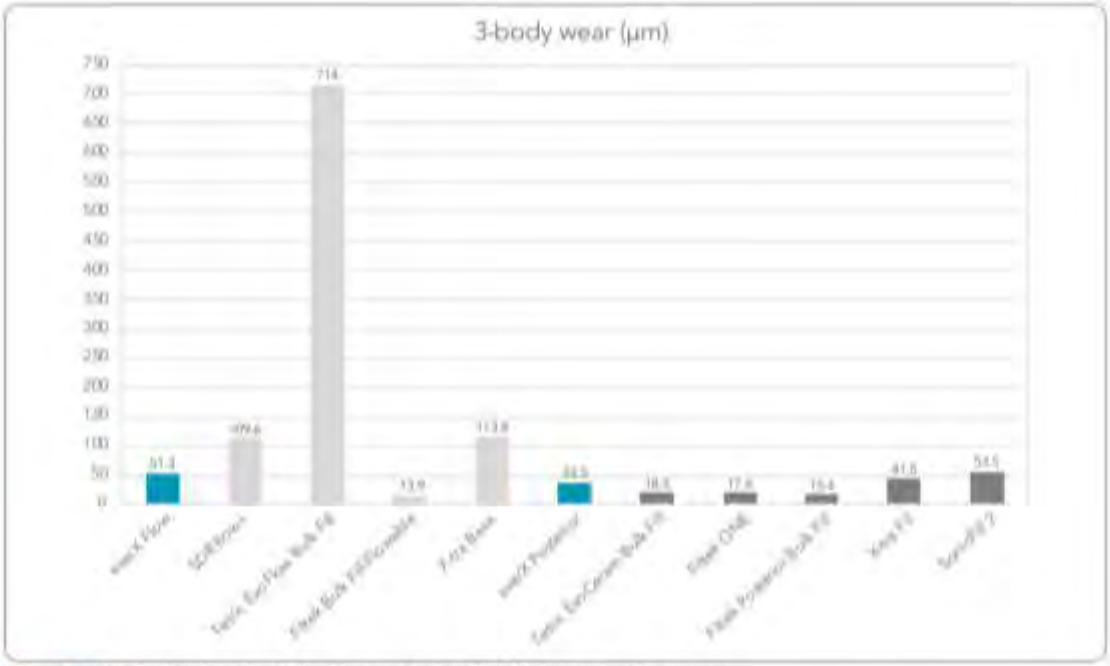
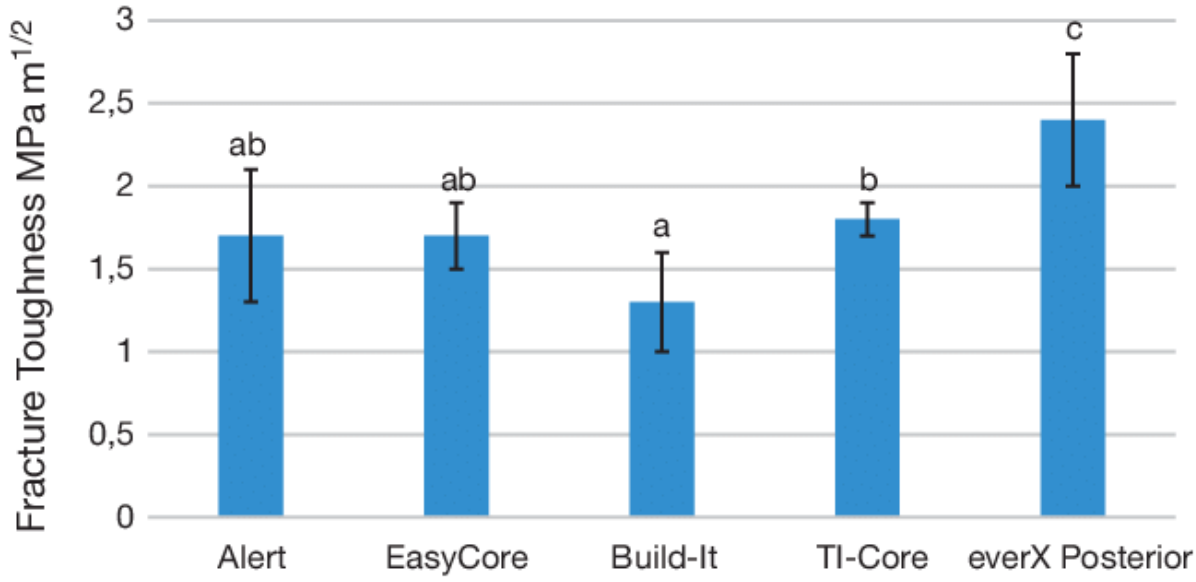


Figure 23 : Three-body wear of everX Flow compared to other bulk flowable & paste composites.
Source: GCC R&D, 2018. Data on file.

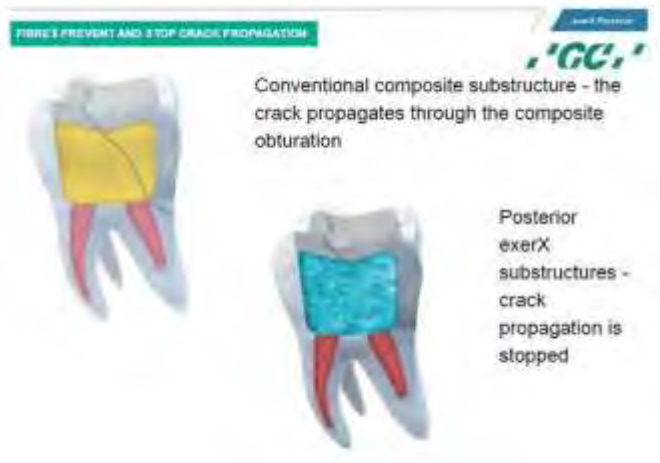
282


Fracture Toughness MPa m1/2
3
2,5
2
1,5
1
0,5
0
ab
ab
a
b
c
Alert
EasyCore
Build-It
TI-Core
everX Posterior

283


FSC TECHNOLOGY
• Full coverage Silane Coating
• Improves coupling between each fiber and the resin matrix
• Increases strength and toughness

284


GC
Conventional composite substructure - the crack propagates through the composite obturation
Posterior exerX substructures - crack propagation is stopped

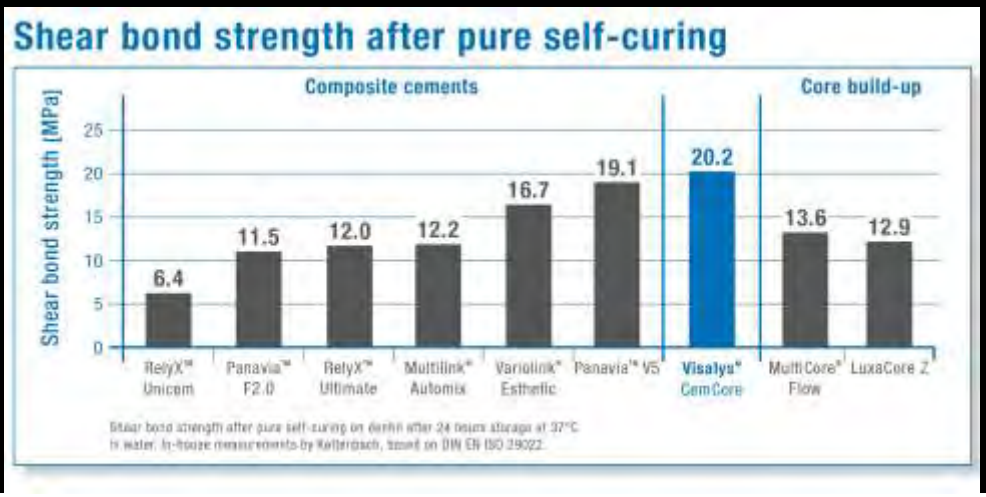
KETTENBACH VISALYS CEMCORE (Dual Cure)

1 Product
2 Indications

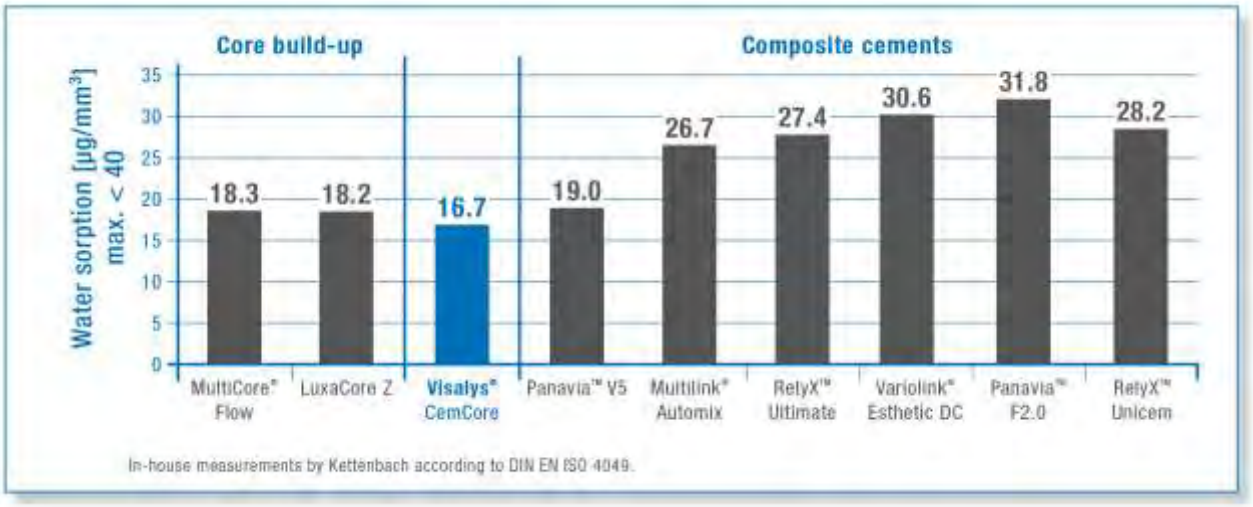
- Cementation of all dental restorations, even in the highly esthetic anterior region
- Suitable for all dental materials used in the final cementation
- Can be used with all etching techniques
- Core build-ups, even in difficult situations

285

Groundbreaking technology that simply eliminates the conflicts: Active-Connect-Technology (ACT) allows optimal mixing of the somewhat hydrophobic cementation composite Visalys CemCore with the hydrophilic Visalys Tooth Primer on the damp surface of the tooth. The innovative composite achieves a high adhesive strength despite its hydrophobic properties while also avoiding swelling.



286


Core build-up
Composite cements
Water sorption [µg/mm³]
max. < 40
35
30
25
20
15
10
5
0
18.3
18.2
16.7
19.0
26.7
27.4
30.6
31.8
28.2
MultiCore® Flow
LuxaCore Z
Visalys® CemCore
Panavia™ V5
Multilink® Automix
RelyX™ Ultimate
Variolink® Esthetic DC
Panavia™ F2.0
RelyX™ Unicem
In-house measurements by Kettenbach according to DIN EN ISO 4049.

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How are you restoring
?
these different preparations

288

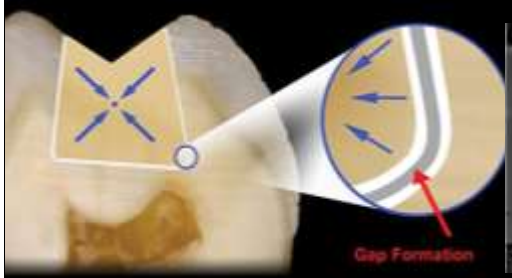
STELLA (SDI)

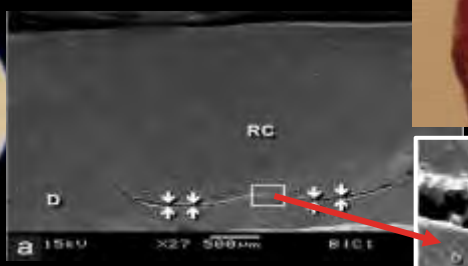
- Revolutionary new technology
- Tooth primer has MDP technology to create adhesion with the tooth
- Dual cure resin is not light curable. It hardens from the outside in due to activation from contact with the primer.
- Unlike resins which shrink toward their mass
- OR starts from a light stimulated reaction at the surface which again promotes shrinkage towards the mass reaction which is at the surface.

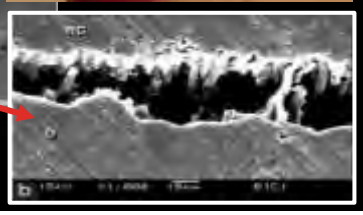
289

"Adhesive dentistry could be expressed as a simple relationship between bonds and stress. If the bonds can withstand the stress, the restorative technique will be successful."

Unterbrink and Liebenberg (1999)

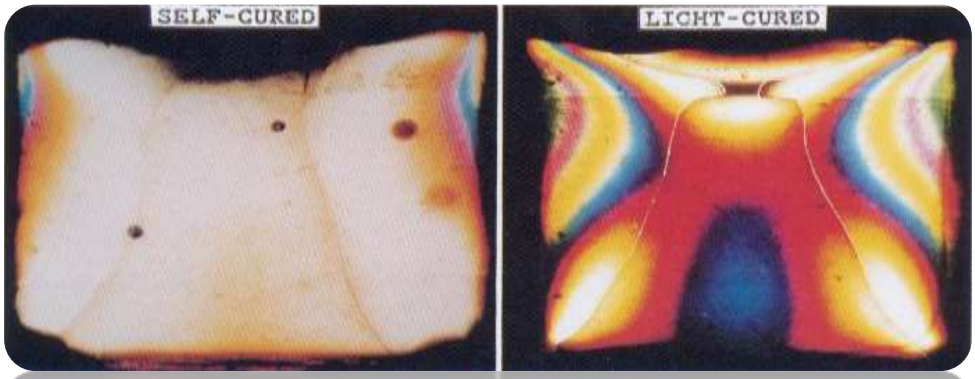






290

Internal (Polymerization) Stresses of Composites



"A Simple Pain-Free Adhesive Restorative System by Minimal Reduction & Total-Etching (1993)
Takao Fusayma DDS,
Tokyo Medical & Dental University

291

INTRODUCING STELA

SDI's innovative new high-performance composite

SDI STELA

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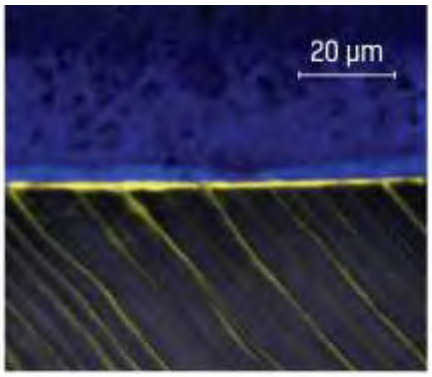
HIGH BOND STRENGTH



STELA BONDING INTERFACE (SELF ETCH)

HIGH BOND STRENGTH

PRIMARY BOND: Stela Primer **chemically bonds** to Stela composite

SECONDARY BOND: **tags** of Stela Primer into the dentinal tubules form **micromechanical retentions**

~SAURO, Salvatore et al. 2022. Microtensile bond strength and interfacial adaptation of two bulk-fill composites compared to a conventional composite restorative system.

SDI STELA

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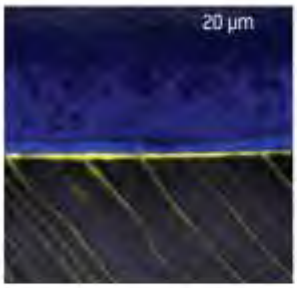
GAP-FREE RESTORATIONS

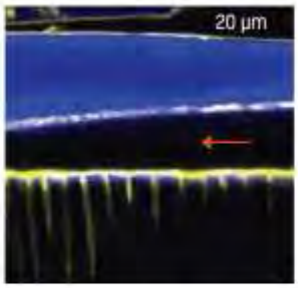


STELA BONDING INTERFACE (SELF ETCH)

A confocal micrograph of a **gap-free Stela-dentine interface** using the self etch Stela Primer.

Note the penetration depth of Stela Primer (yellow) within the dentine tubules.

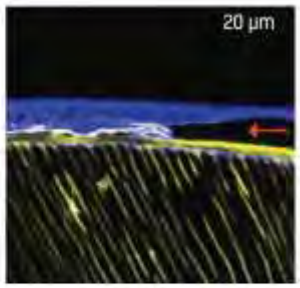
Pre-test failure rate: 0%



FILTEK ONE BULK FILL (SELF ETCH)

A confocal micrograph showing the dentine interface of **Filtek One Bulk-Fill (3M ESPE), in self etch mode**. The red arrow shows the **presence of gaps**

Pre-test failure rate: 75%



FILTEK ONE BULK FILL (ETCH & RINSE)

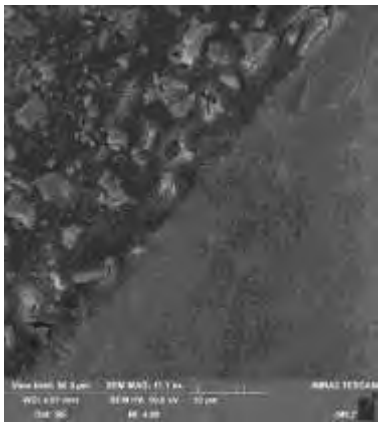
A confocal micrograph showing the dentine interface of **Filtek One Bulk-Fill (3M ESPE)**, in **etch & rinse mode**. The red arrow shows the **presence of gaps**

Pre-test failure rate: 10%

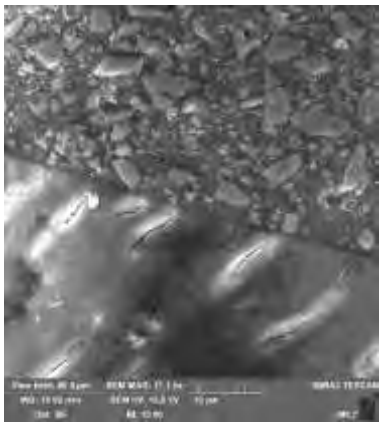
294

STELA IN VITRO EVALUATION

Gap free with enamel



Gap free with dentine

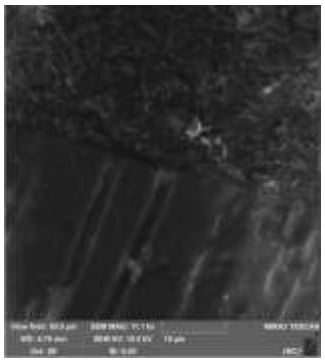


Source: Dental Advisor Biomaterials Research Center

295

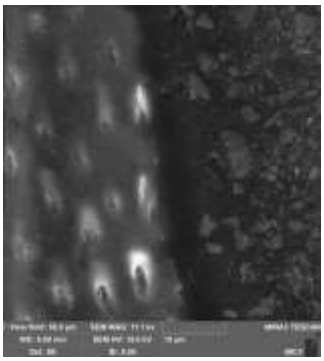
THE SCIENCE OPTIMIZES PATIENT OUTCOMES

Laboratory Evaluation of Stela Composites Biomaterials Research Results Nov 17 2023; Cowen, Shoukat, Powers (Dental Advisor Biomaterials Research Centre)



'Dentin Margins have continuous margins in all reviewed specimens….There couldn't be a better result in dentin bonding from this evaluation.'

'Stela Automix with Stela Primer showed excellent marginal adaptation and no marginal gaps at the bottom of large restorations.'



STELA CURES FROM THE MARGINS, NOT FROM THE LED CURING LIGHT

- **Reduce the risk of restorative failures**
- Reduce patient chair time
- **Increase patient comfort**
- Reduce inventory
- **Reduce complicated procedures**
- Increase Long Term Aesthetic Stability

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THE FUTURE IS SIMPLE

Just Prime and Fill! | No Light-cure Required! | One Shade!

1. Apply Stela Primer with Points, leave it for 5 sec, and blow air for 2-3 sec

2. Fill the entire cavity in a single step with Stela Capsule or Automix

3. After 4 min of extrusion or capsule mixing, wipe the inhibition layer and finish with burs and water spray

SDI | YOUR OUR SMILE. VISION.

297

GAP-FREE RESTORATIONS

- Light cure polymerisation begins in the area closest to the light source
- The resulting polymerisation shrinkage pulls the restorative from the cavity walls creating micro gaps
- Stela's self-cure polymerisation begins from the applied Stela Primer on the cavity walls
- This polymerisation sequence microscopically pulls the restorative towards the cavity and not away from it

SDI | YOUR OUR SMILE. VISION.

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HIGH STRENGTH – REIMAGINE THE BENEFITS

Product	Flexural Strength, MPa
Stela Automix	146 (7)
Stela Capsule	145 (16)

Product	Compressive Strength, MPa
Stela Automix	329 (32)
Stela Capsule	340 (13)

~Biomaterials Research Results Nov 17 2023: Matt Cowen, B.S., Maira Shoukat, B.S., John M. Powers, Ph.D. Laboratory Evaluation of Stela Composites
DENTAL ADVISOR Biomaterials Research Centre,

'The flexural strength is above average for composites, and especially other competitive flowable and capsule based restoratives.'

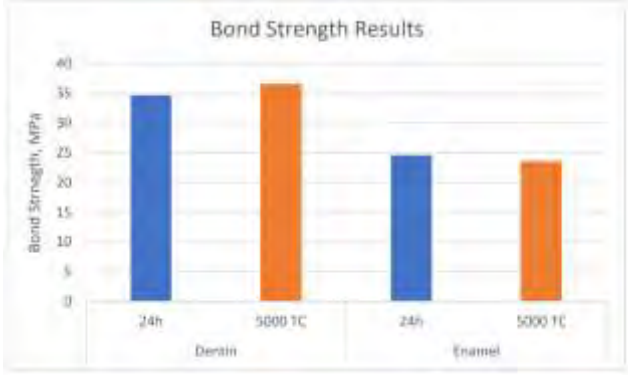
Laboratory Evaluation of Stela Composites: Cowen et al

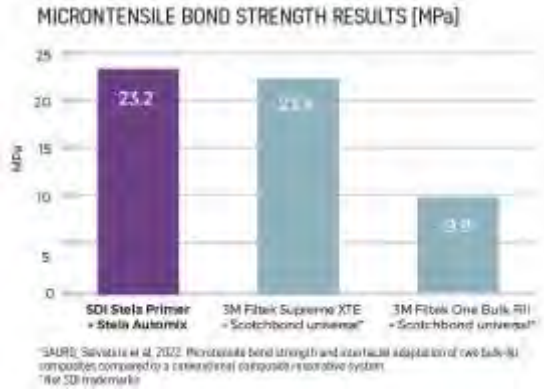
YOUR OUR SMILE. VISION.

299

HIGH STRENGTH – REIMAGINE THE BENEFITS

'Stela has mechanical strength properties which are above average compared to other composites…'





~Biomaterials Research Results Nov 17 2023: Matt Cowen, B.S., Maira Shoukat, B.S., John M. Powers, Ph.D.
Laboratory Evaluation of Stela Composites
DENTAL ADVISOR Biomaterials Research Centre,

YOUR OUR SMILE. VISION.

300

STELA INDICATIONS

Paediatric Dentistry

Geriatric Dentistry

Core build-ups

Base or liner

Sealing endodontic access cavities where light cannot access

Stela Primer is indicated for dentine and enamel bonding

301

ADDITIONAL FEATURES

SDI STELA

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STELA (SDI)

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STELA RECAP

- Ideal for most clinical situations – Class I, II, III, V
- Gap-free interface
- Just 2 simple steps: 15 seconds preparation
- High combination of compressive and flexural strength
- High bond strength, including MDP
- Unlimited depth of cure
- Contains fluoride and calcium
- Available in syringe or capsule
- Universal shade

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BIOACTIVE CEMENTS

305

306


Anterior Indirect Cosmetic Restorations

307


Posterior Crown & Bridge

308

WHICH IS BEST??
WHY??

Light Cured Adhesion

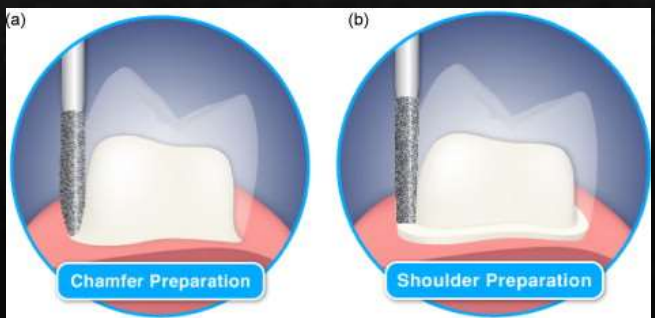
Dual Cured Adhesion

Cementation

309

PREPARATION DESIGN…

BEFORE YOU BEGIN:
-WHAT IS THE FINAL APPEARANCE?
-PREPARATION DESIGN?
-COLOR?



310

ONCE YOU KNOW COLOR AND MATERIAL…

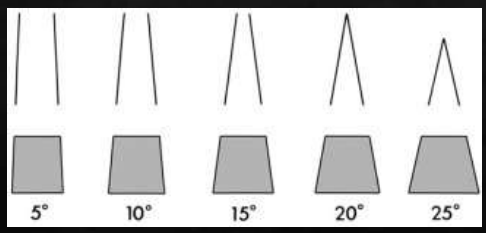
- Adequate reduction
- Axial wall angulation 5-8˚taper
- Axial wall height 4mm or more
- Margin design

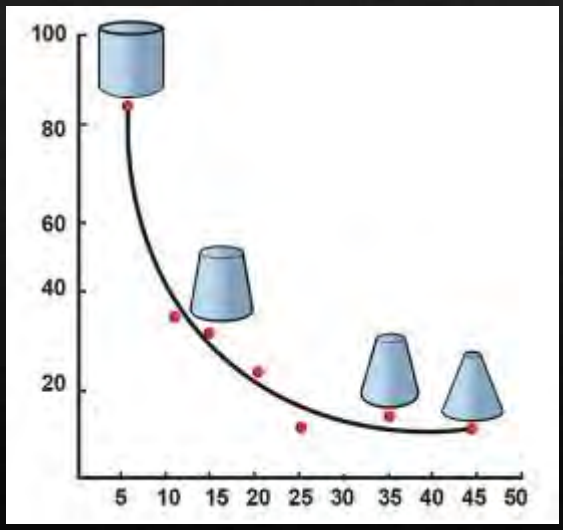
311

Margin refinement with electric handpiece @ 2,000-10,000 rpms

312

Journal of Prosthetic Dentistry





https://www.thejpd.org/article/S0022-3913(01)57751-3/fulltext

313

Ask Yourself While You Are Preparing The Tooth:

-Will I be able to isolate well?

-HOW WILL I CEMENT?

314

RESIN MODIFIED GLASS IONOMERS (RMGI)

- CAPSULES
- DUAL BARREL PAST TO PASTE

315

Fast Easy, Beneficial

- FujiCEM Evolve (RMGI Cement)
- High bond strength to zirconia
- New tack-cure feature reduces cleanup time to seconds
- High radiopacity for easy visualization
- Ideal for cementation of zirconia, PFM and lithium disilicate restorations
- Rechargable fluoride release and moisture tolerance

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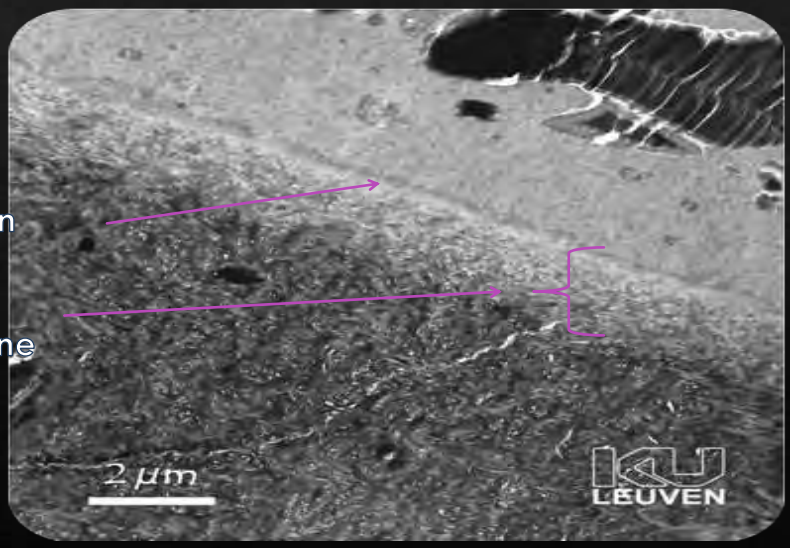
Glass Ionomer Tooth Interface



CARDOSO et al. J Dent 2010

317

CALCIUM SILICATE CEMENT THERACEM (BISCO)

Delivering a strong bond to Zirconia and most substrates, along with easy clean-up & high radiopacity, and bioactivity

Recommended uses
-crowns
-bridges
-inlays
-onlays
-prefab, metal, non-metal, fiber posts

318

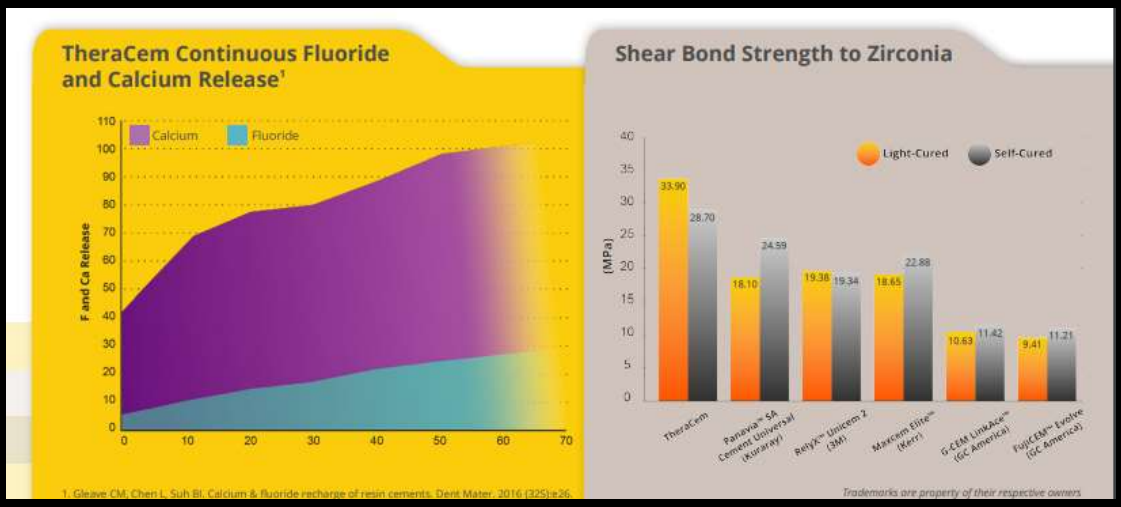
CALCIUM SILICATE CEMENT THERACEM (BISCO)

Delivering a strong bond to Zirconia and most substrates, along with easy clean-up and high radiopacity,

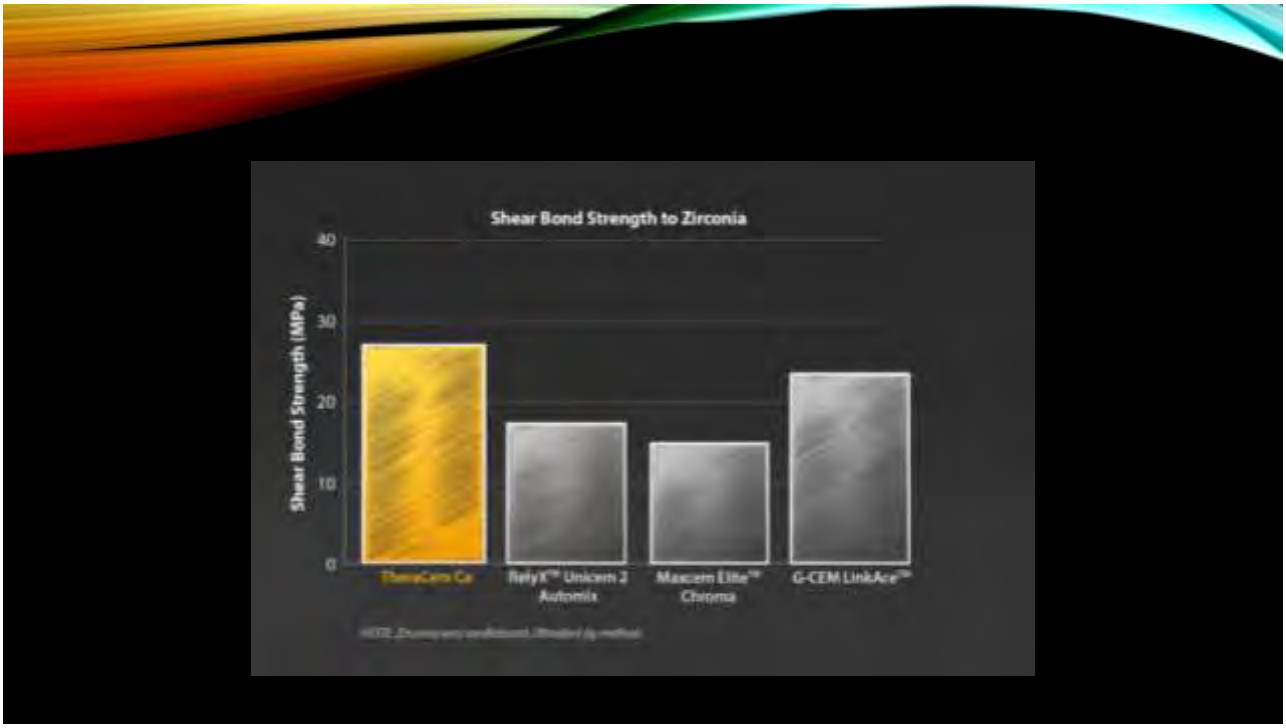
Unique Benefits:

- Continuous Calcium and Fluoride release[1]
- Transitions from acidic to alkaline pH in minutes[2]
- Contains MDP, allowing for a strong bond to zirconia, metal, and alumnia substrates without the use of a primer.
- Specially formulated to allow for quick and easy clean-up
- A high degree of conversion ensures a higher physical strength
- Easy to identify on radiographs for quick and effective diagnosis
- Easy auto-mix, dual-syringe provides a consistent mix for immediate delivery

319



320



321

CEMENTATION TECHNIQUE

322

- Step 1 clean prep
- Step 2 dispense into crown
- Step 3 place crown
- Step 4 tack cure margins 2-3 seconds]
- Step 5 remove excess cement
- Step 6 light cure 20-30 seconds or allow self cure (light cure will accelerate self cure)

323

ACTIVA (PULPDENT)

324

ACTIVA (PULPDENT)

THE DENTAL ADVISOR
ACTIVA BioActive-Restorative
Two-year Clinical Performance
+++++ 98% rating

325

KEY FEATURES:

Tough, resilient, fracture resistant, absorbs shock
Insoluble
Releases and recharges calcium, phosphate and fluoride
Chemically bonds – Seals against microleakage
No sensitivity
Moisture tolerant – Simplified technique – No etching, no bonding
Light cure and self-cure
Available in A2 and translucent shades

326

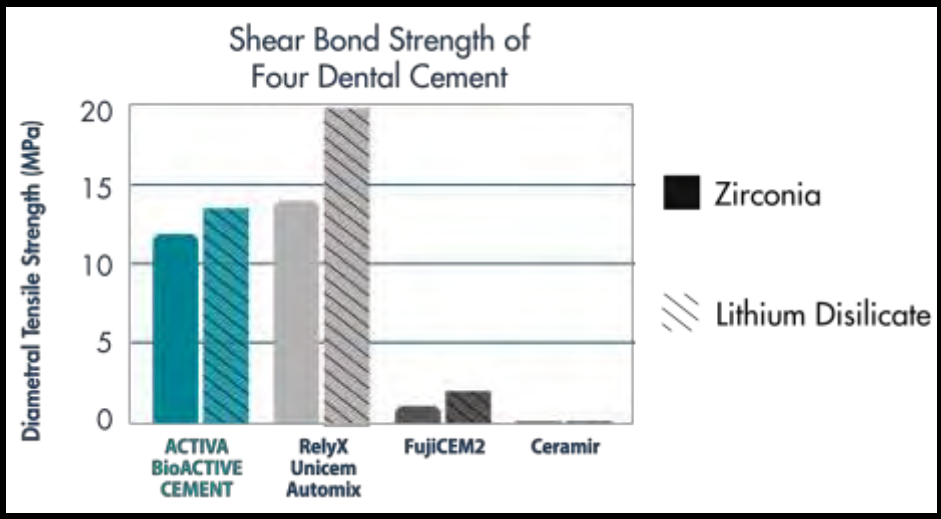
SIMPLIFIED BIOACTIVE CEMENTATION…

327

Cement Selection

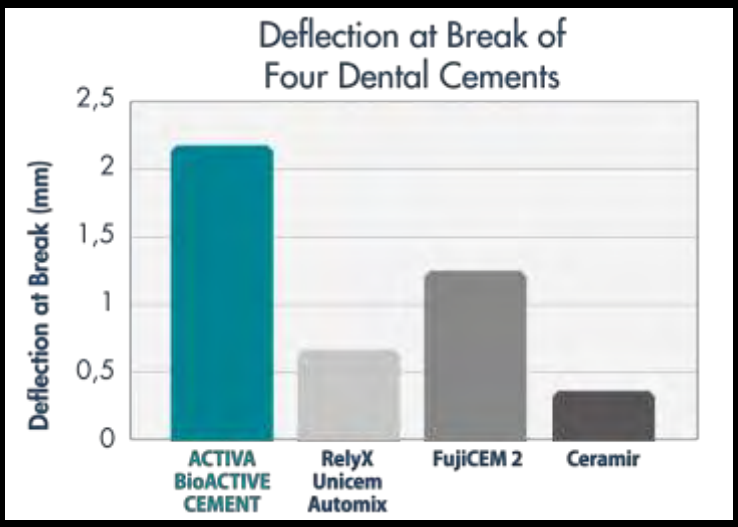
328

ACTIVA (PULPDENT)



329

ACTIVA (PULPDENT)



330

Calcium Aluminate – Glass Ionomer

- Alkaline pH 8.5
- Moisture Tolerant
- Self Sealing
- Apatite Formation
- Insoluble/No Degredation
- Stronger with time
- Semi / Translucent
- Biocompatibility-Excellent
- Bioactivity-Apatite formation
- No silane, conditioning, bonding

331

Bioactivity

A reactive bioactive system that contributes to hydroxyapatite mineralization of hard tissue through ion release and alkaline pH.**

Calcium Aluminate/Glass Ionomer Hybrid Cement**

332

Cementation Technique

Calcium Aluminate/Glass Ionomer Hybrid Cement**

Mix for 8-10 seconds
.17ml vs single cap .10ml
3-4 restorations

333

LITHIUM DISILLICATE (EMAX) OR ZIRCONIA

- Silane is contraindicated
- Tooth etching or conditioning is not necessary
- Bonding agent is not needed

334

Zirconia Restorations

- Cleaning w/ phosphate scavengers is not necessary
- Silane is contraindicated
- Tooth etching or conditioning is not necessary
- No bonding agent necessary

335

Cement Selection

A Bioactive Dental Luting Cement—Its Retentive Properties and 3-Year Clinical Findings

Steven R. Jefferies, MS, DDS, PhD; Cornelis H. Pameijer, DMD, DSc, PhD; David C. Appleby, DMD, MScD, FACP; Daniel Boston, DMD; and Jesper Lööf, PhD

ABSTRACT—A clinical validation study was conducted to determine the performance of a new bioactive dental cement

Three year recall data yielded no loss of retention, no secondary caries, no marginal discoloration, and no subjective sensitivity. All restorations rated excellent for marginal integrity.

recall examination included 14 single-unit full-coverage crown restorations, four three-unit bridges supporting eight abutments, and one two-unit splint. Three-year recall data yielded no loss of retention, no secondary caries, no marginal discolorations, and no subjective sensitivity. All restorations rated excellent for marginal integrity. Average visual analogue scale (VAS) score for tooth sensitivity decreased from 7.63 mm at baseline to 0.44 mm at 6-month recall, 0.20 mm at 1-year recall, and 0.00 mm at 2- and 3-year recall. Average gingival index (GI) score for gingival inflammation decreased from 0.56 at baseline to 0.11 at 6-month recall, 0.16 at 1-year recall, 0.21 at 2-year recall, and 0.17 at 3-year recall. After periodic recalls up to 3 years, Ceramic C&B Bridge has performed quite favorably as a luting agent for permanent cementation of permanent restorations. In vitro crown-coping retention studies were also conducted using this cement and various control cementation materials. Mean laboratory retentive forces measured for Ceramic C&B were comparable to other currently available luting agents for both metal and all-ceramic indirect restorative materials.

Keywords: dental cement, cementation, luting cement, bioactive, crowns, bridges, gold, PFM

336

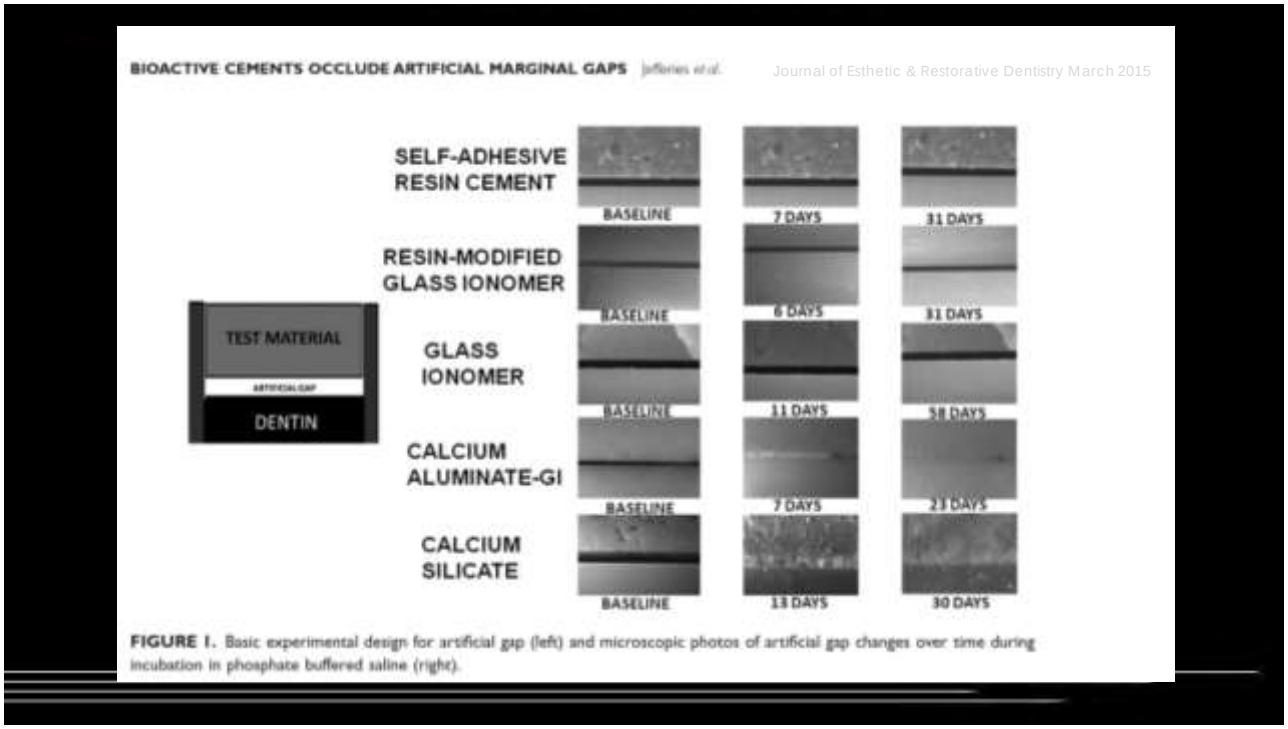


FIGURE 1. Basic experimental design for artificial gap (left) and microscopic photos of artificial gap changes over time during incubation in phosphate buffered saline (right).

337

338

339

Kettenbach

Panasil Initial Contact (VPS)

340

VISALYS (Kettenbach)

Proprietary multifunctional acrylic composite.
Suitable for the fabrication of temporary crowns, partial crowns, bridges, inlays, onlays and veneers.

- Made without BPA
- High Strength
- Natural Luster
- Unsurpassed break resistance
- Incredible polish and luster

341

LuxaCrown (Kettenbach)

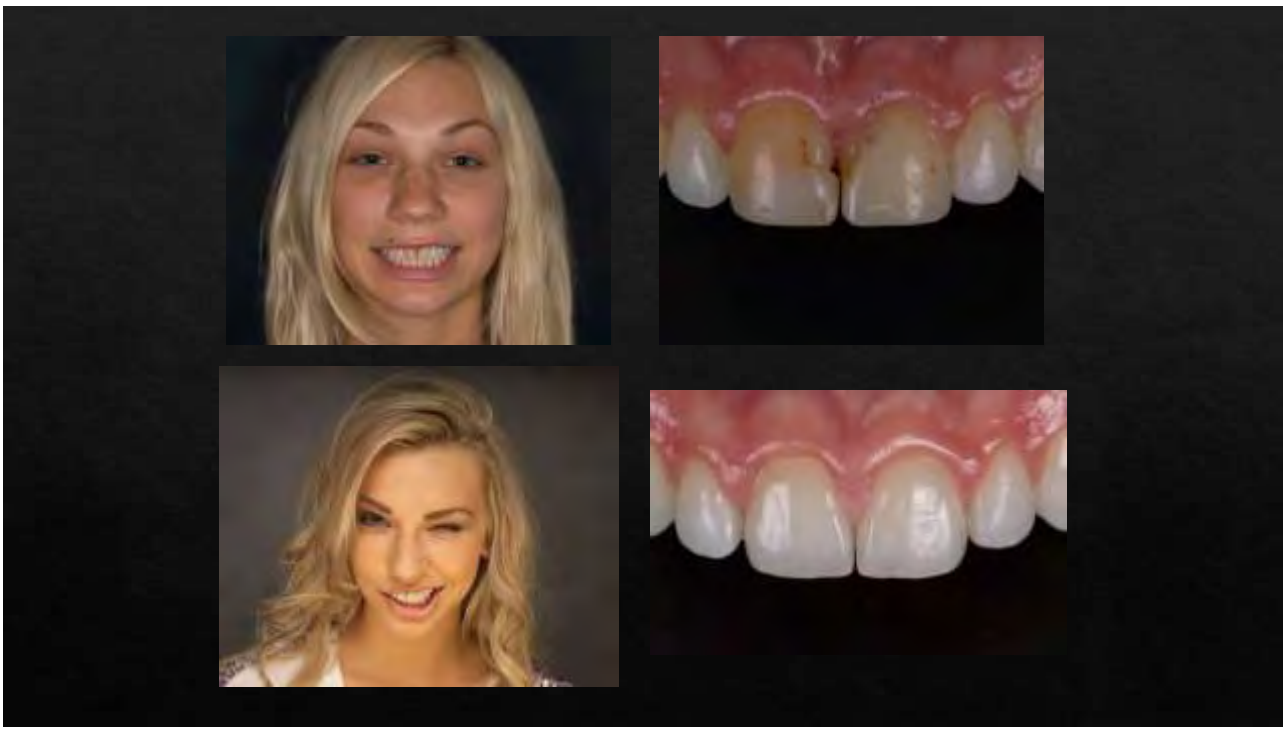
The unique LuxaCrown allows for the simple, quick and cost-effective manufacture of long-lasting restorations – directly chairside.
Offer your patients an excellent and reliable alternative to lab processed crowns. The easy to make composite restoration is highly aesthetic and shows remarkable longevity.

- Strength for lengthening or bruxism
- Excellent polish
- Long lasting durability
- Fast and easy to place

342


LuxaCrown
Chairside Crown & Bridge Material
Compressive Strength
333 MPa
*Displayed high compressive strengths similar to composite resin material. Data on file.
Wide Range of Indications:
Implant, Pediatric, Geriatric, Cosmetic, Root Canal Cases
FIVE Shades
A1
A2
A3
A3.5
B1
24 3-unit Bridges/ Cartridge
5 Minutes to Create a Crown
36 Single Crowns/ Cartridge
Flexural Strength
154 MPa
*Exhibited high flexural strength as compared to ceramic. Data on file.
Fracture Toughness
2.00 MPa*m^0.5
*Increased overtime in comparison to materials that decreased overtime. Data on file.
Barcol Hardness
66
ADA Codes: 02394 | 02710
DMG

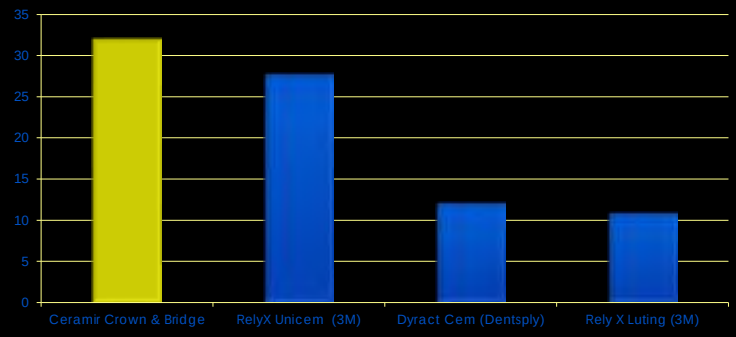
343



344

Crown Retention

Results Zirconia crowns (Kg/F)



Material	Result (Zirconia crowns) Kg/F
Ceramir Crown & Bridge	32.1 ± 6.3
RelyX Unicem (3M)	27.8 ± 11.3
Dyract Cem (Dentsply)	12.2 ± 3.1
Rely X Luting (3M)	10.9 ± 6.5

345

346

Technique

Simplify Cementation

-Silane is contraindicated

-Restoration does not have to be cleaned after tryin

-Tooth etching or conditioning is not necessary

-Bonding agent is not needed

Research/Literature**

Moisture Tolerant

No Sensitivity

Alkaline pH

Apatite Forming

Insoluble

Stronger With Time

Self Sealing

347

Lithium Disillicate (eMax)

348

Doxa Ceramir Technique

- Clean tooth
- Try-in restoration
- 1 quick air blast to dry crown
- DO NOT USE primers on crown
- No bonding agent required
- Leave prep slightly moist
- Activate and triturate capsule
- 2 minutes working time
- Clean up at gel phase at 3 minutes
- Fully set at 5 minutes

349

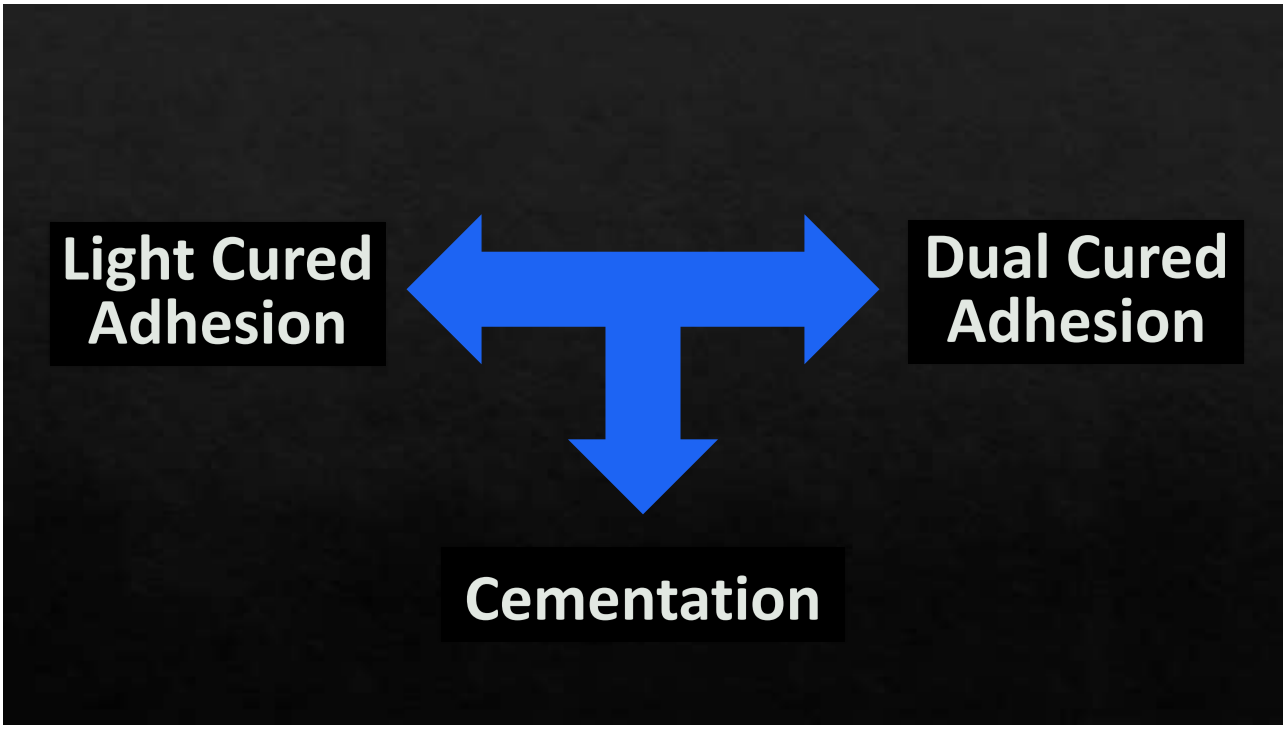
SE Resin Cements

373

Technique (Follow manufacturer Protocols)

- Clean tooth
- Try-in restoration (Highly recommend cleaning with a zirconia cleanser)
- Dispense small amount from both sides simultaneously onto paper towel or gauze prior to first use.
- Add mixing tip
- Dispense a little drop onto table
- Then dispense directly into restoration or onto tooth
- Seat with moderate/firm pressure to displace cement and seat restoration
- Allow to either self cure or tack cure based on opacity
- Remove excess during gel phase or after
- Finish & polish

374



375

Ceramic Try-in

-Clean Tooth

-Try-in with water soluble try-in paste, not water *(When necessary)*.

-Clean & Decontaminate

376

Whip Mix: Preppies

- Preppies™ Flour of Pumice Paste has been specifically formulated for dental professionals requiring a cleaning agent that contains no flavoring agents, oils or fluoride. Pumice Preppies™ leave no residue and are ideal for a variety of operatory procedures

377

Danville: Microetcher IIa

- DO NOT HIT GUM TISSUES or it will BLEED!!!

378

KerrHawe: OptiClean

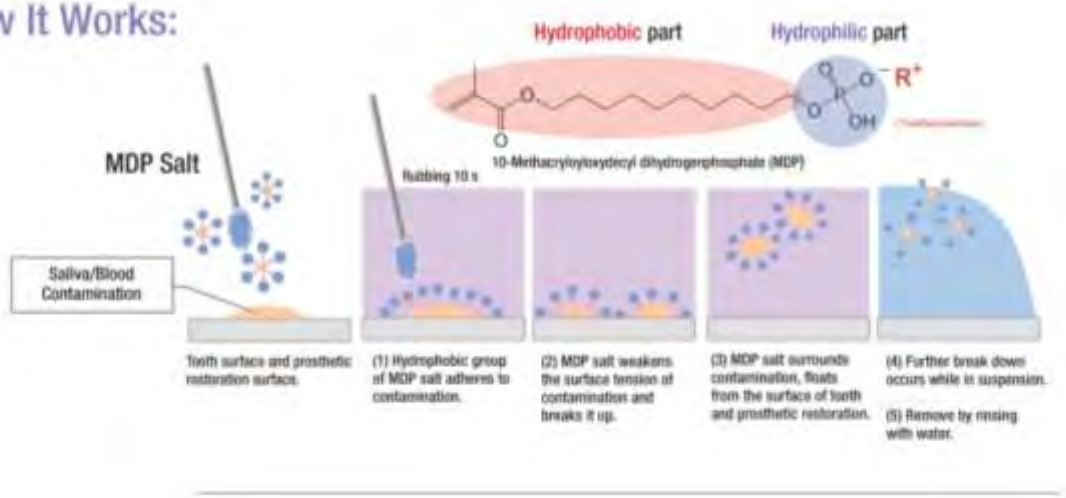
- OptiClean™ removes all traces of temporary cement and delivers a perfectly clean cementation surface of the entire tooth preparation in literally seconds.
- MY FAVORITE

379

Clean the Intaglio of the Zirconia Restoration with Phosphate Scavengers

380

How It Works:



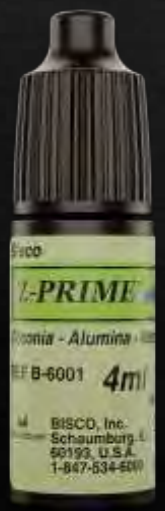
381

Ceramic Primers w/ MDP (Not Silanes)

- S… enhance… trengths to …lumina an… substrates d… ue comb… vo active m… DP, a ph… nomer, an… carboxyl… er*
- C… n light-c… ual-cure r… nents
- C… gle bot…

382

Zirconia Cementation Protocol



SANDBLASTED BY LAB

1. Try in the restoration
2. Decontaminate with ZirClean or other cleanser
3. Rinse
4. Apply Z-PRIME Plus or other Ceramic Primer

SANDBLASTED BY CLINICIAN

1. Try in the restoration
2. Sandblast
3. Decontaminate with ZirClean or other cleanser
4. Rinse
5. Apply Z-PRIME Plus or other Ceramic Primer

383

Resin Cement Selection

- Light Cured Resin Cement
  - Thin / Translucent Ceramic
  - Total etch
  - Selective etch
  - Self etch
- Dual Cured Resin Cement
  - Thick Ceramic or Opaque Ceramic
  - Total etch
  - Selective etch
  - Self etch

384

385

Uni-Etch is a 32% semi-gel phosphoric acid etchant available with Benzalkonium Chloride (BAC) and designed for **etching** tooth structure prior to bonding.

386

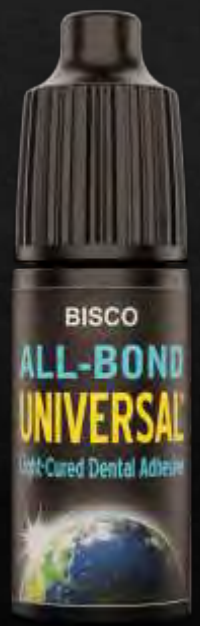
Select HV Etch is a 35% high viscosity phosphoric acid etchant available with Benzalkonium Chloride (BAC) and is designed for pin-point accuracy.

387

Adhesives

388

- **Light-Cured Dental Adhesive**
  All-Bond Universal is a truly universal adhesive it can be used with direct and indirect restorations and is formulated to be compatible with light-, dual- and self-cured materials. The versatility of All-Bond Universal makes it an indispensable part of any dental practice.
- **Unique Benefits:**
- Not moisture sensitive use on wet, dry or moist tooth structure
- Impressive bond strength to ALL substrates
- Use with ALL direct and indirect restorations (<10 micron thickness)
- Ideal chemical balance for both total- and self-etch adhesion from one bottle
- Compatible with ALL resin cements (no additional activator required)
- Virtually no post-operative sensitivity
- **Clinical Significance:**
- All-Bond Universal offers the flexibility for total-, self- and selective-etch procedures
- All-Bond Universal is compatible with all light-, self- and dual-cured resin composite and cement materials for all direct and indirect procedures
- All-Bond Universal works with dual cure resins, NO activator is required



389

Choice 2 Veneer Cement (Bisco)

- Light-cured luting cement designed for cementation of porcelain veneers.
- Color stability.
- Corresponding try-in pastes (sold separately)
- Choice 2 is specifically formulated for color stability (Delta E <1.2**) resulting in high esthetics
-Highly filled resin cement enhances the overall strength of the restoration
-Low film thickness ensures veneers are completely seated
-Corresponding try-in pastes confirm shade selection prior to cementation
-Choice 2 cement will not change (shade shift) over time, a problem that can occur with dual-cured systems

390

Review

- Check the etch from lab (etch if needed)
- Clean tooth/teeth
- Water soluble try-in gel
- Clean and decontaminate ceramic
- Ceramic Primer
- Isolation
- Etch, selective or self etch tooth
- Adhesive
- Porcelain bonding resin on veneer
- Light cured resin cement on veneer
- Cure
- Clean up

391

Light Cured Adhesion

Dual Cured Adhesion

Cementation

392

Dual Cured Resin Cements (for inlays, onlays, cores and crowns)

393

DO NOT MIX Adhesives & Dual Cure Resins

394

Lithium Disilicate & Silicate, Leucite, Feldspathic & Zirconia restorations

- Dual Cured
- Quick Clean Up
- High Conversion
- Low Film Thickness
- Radiopaque
- Available in Universal (A2) & Milky White shades

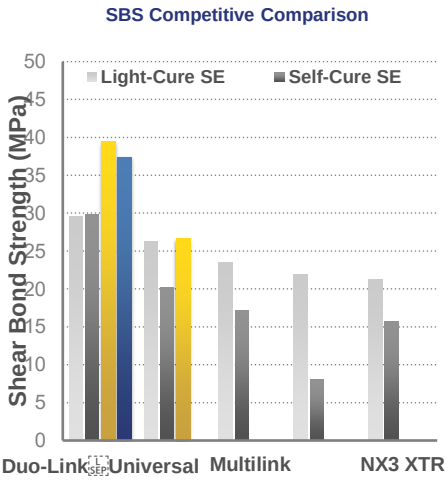
395

DUO-LINK UNIVERSAL™

A ***Universally Simple, Universally Strong*** adhesive resin cement specially formulated for cementation of ALL* indirect restorations.

- Universal - for all cementation procedures*
- Formulated to allow for quick and easy removal of excess cement
- Easily identified on radiographs for quick and effective diagnosis
- High degree of conversion in both light- and self-cured modes ensures a strong, long lasting restoration
- Easy to use auto-mix, dual-syringe provides a consistent mix for immediate delivery
- Ideal for all chairside and lab-fabricated restorations
- Available in Universal (A2) & Milky White shades

* It is recommended to use BISCO's CHOICE™ 2 for veneer cementation.



Data on file. BISCO, Inc.

BISCO

396

397

398

Clean the Intaglio of the Zirconia Restoration with Phosphate Scavengers

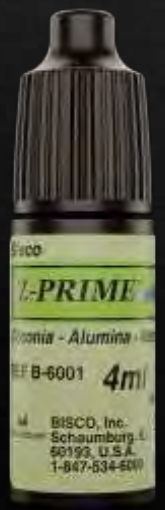
399


Ceramic Primers w/ MDP (Not Silanes)
• S enhance trengths
to lumina an substrates
d ue comb o active
m DP, a ph nomer,
an carboxyl er*
• C n light- ual-cure
nents
• C gle bot
L-PRIME
B-6001 4ml
BISCO, Inc
Schaumburg, IL
60193, U.S.A.
1-847-534-6000
Peak - ZM
zirconia Prime
CLEARFIL
CERAMIC PRIMER PLUS
4ml
CERAMIC PRIMER II
3mL
FLAMMABLE
GC
CERAMIC PRIMER II

400

401

Zirconia Cementation Protocol



SANDBLASTED BY LAB

1. Try in the restoration
2. Decontaminate with ZirClean
3. Rinse
4. Apply Z-PRIME Plus

SANDBLASTED BY CLINICIAN

1. Try in the restoration
2. Sandblast
3. ZirClean
4. Rinse
5. Apply Z-PRIME Plus

402

Zirconia Cementation Protocol

- Try-in
- Clean zirconia
- Place ceramic primer
- Adhesive on tooth (no pooling)
- Light cure
- Dual cured resin cement in crown.
- Seat
- Wipe off gross excess
- Cure or wait
- Clean up

403


G-CEM LinkForce

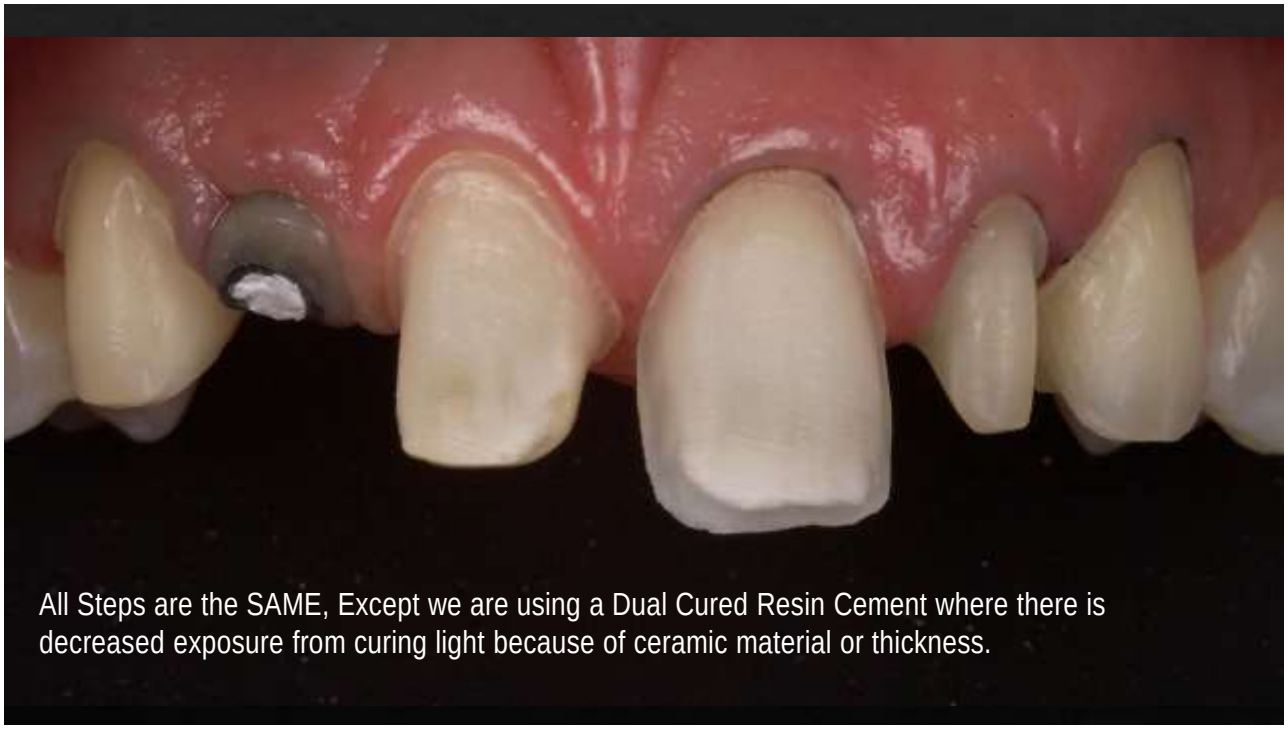

Variolink Esthetic
ivoclar vivadent


3M
RelyX
Universal
STEP
STEP

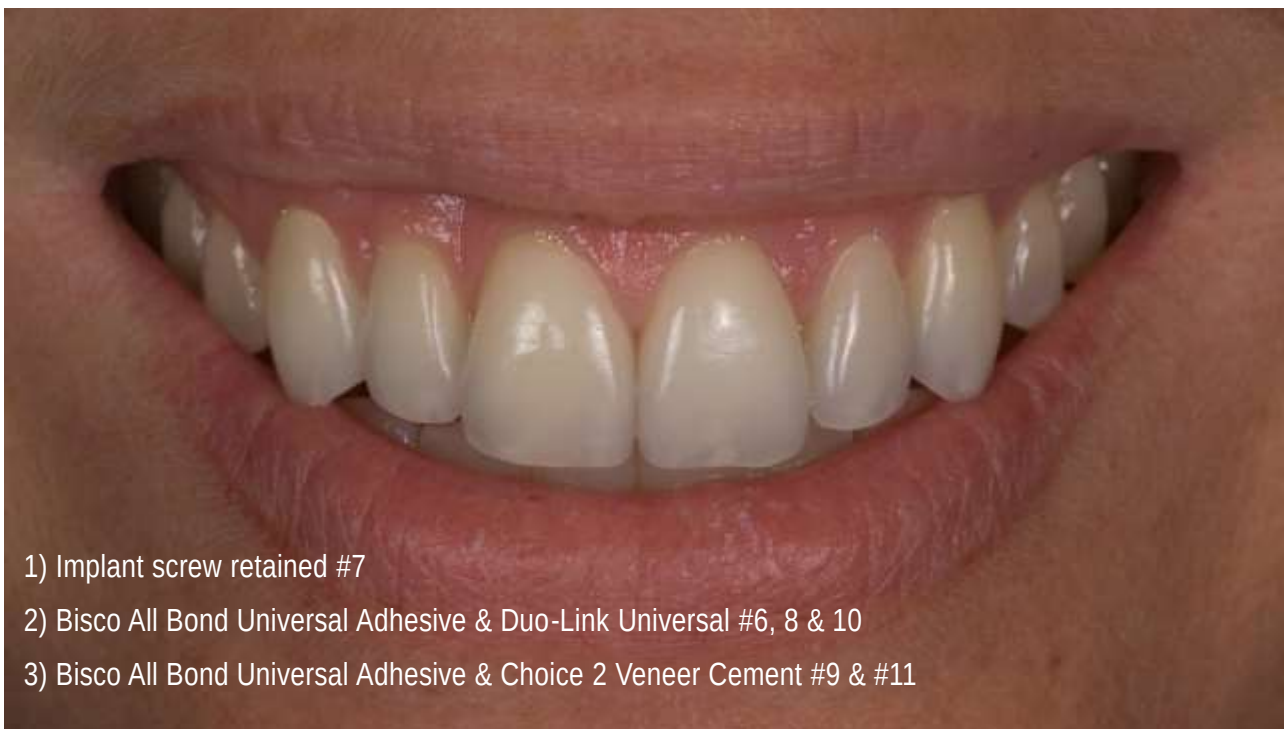

PANAVIA V5

404

405


All Steps are the SAME, Except we are using a Dual Cured Resin Cement where there is decreased exposure from curing light because of ceramic material or thickness.

406


1) Implant screw retained #7
2) Bisco All Bond Universal Adhesive & Duo-Link Universal #6, 8 & 10
3) Bisco All Bond Universal Adhesive & Choice 2 Veneer Cement #9 & #11

407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Scan QR code to view all ODA promotions
Or stop by booth
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LEGION
LEGION
LEGION was founded by Dr. Todd Snyder to help dentists remove frustrations and become more successful in business.
The Goal is to strengthen and empower dentists by giving them the systems, skills, tools and training that they never received in school so that they can be more financially successful in both business & life!
Running a Business, High Performance Marketing, Strategic Sales Skills, Business Systems, Team Training, Technology, Habits & Goals, Cosmetic & Restorative Dentistry, Occlusion & Photography
IF YOU ARE READY FOR SOMETHING BETTER ...
Get After It Now!

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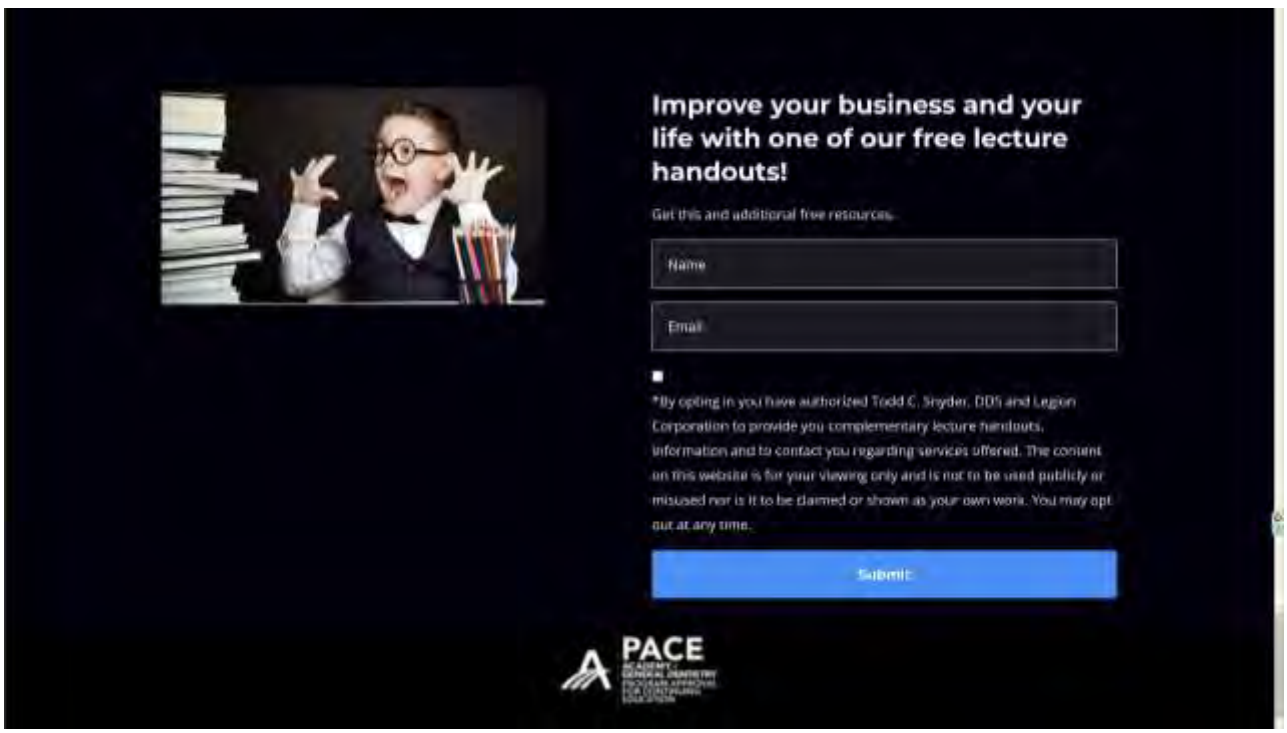
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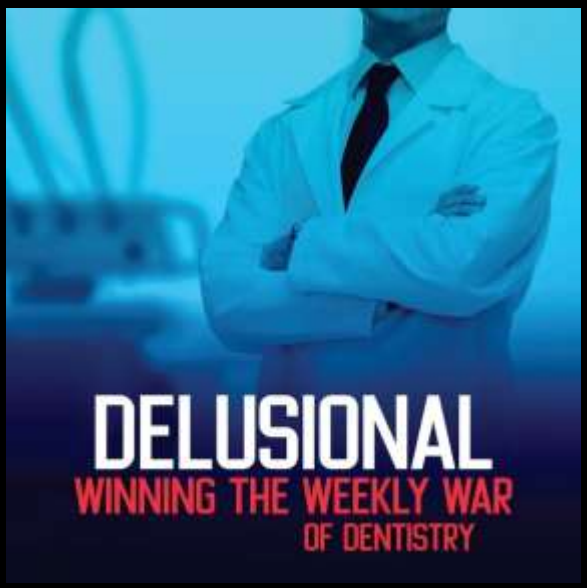

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- Access to Training Content for LIFE
- 30 CE Units
- Optional Hands On with Cases and Materials

420