DIRECT RESTORATIONS

CONTACTS, COMPLICATIONS AND OCCLUSION

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LEGION

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WHAT IF!

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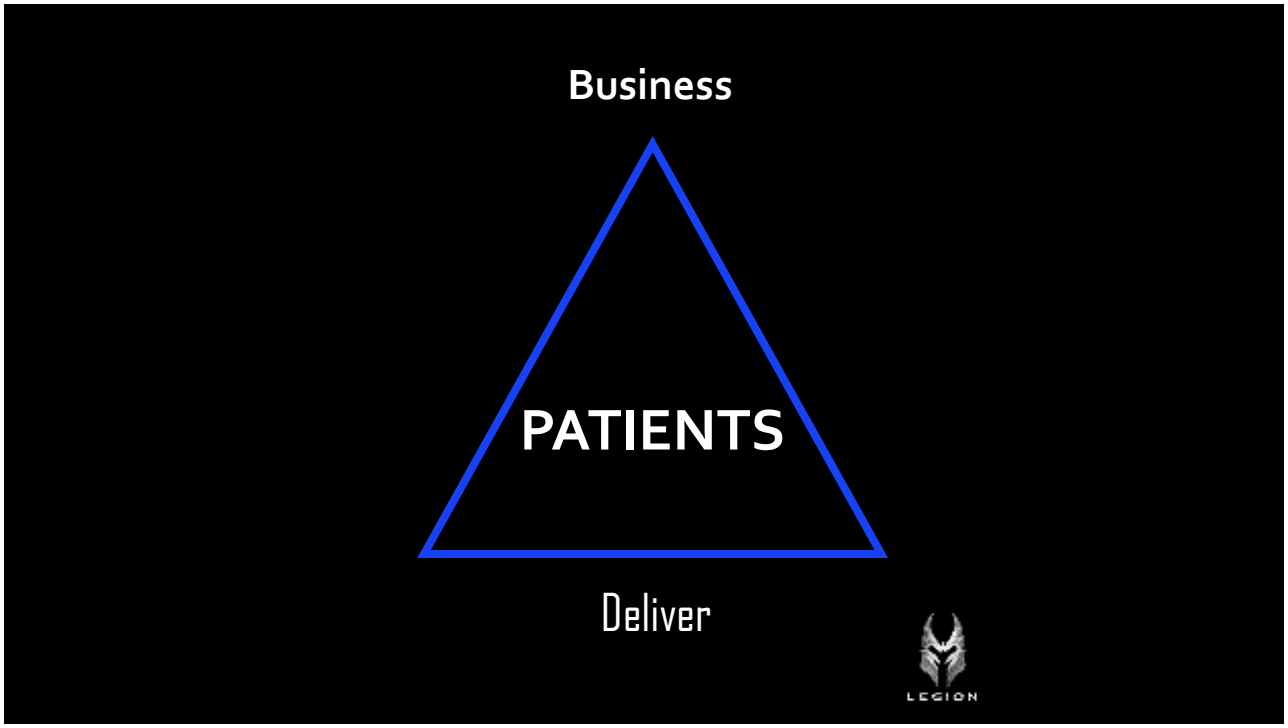
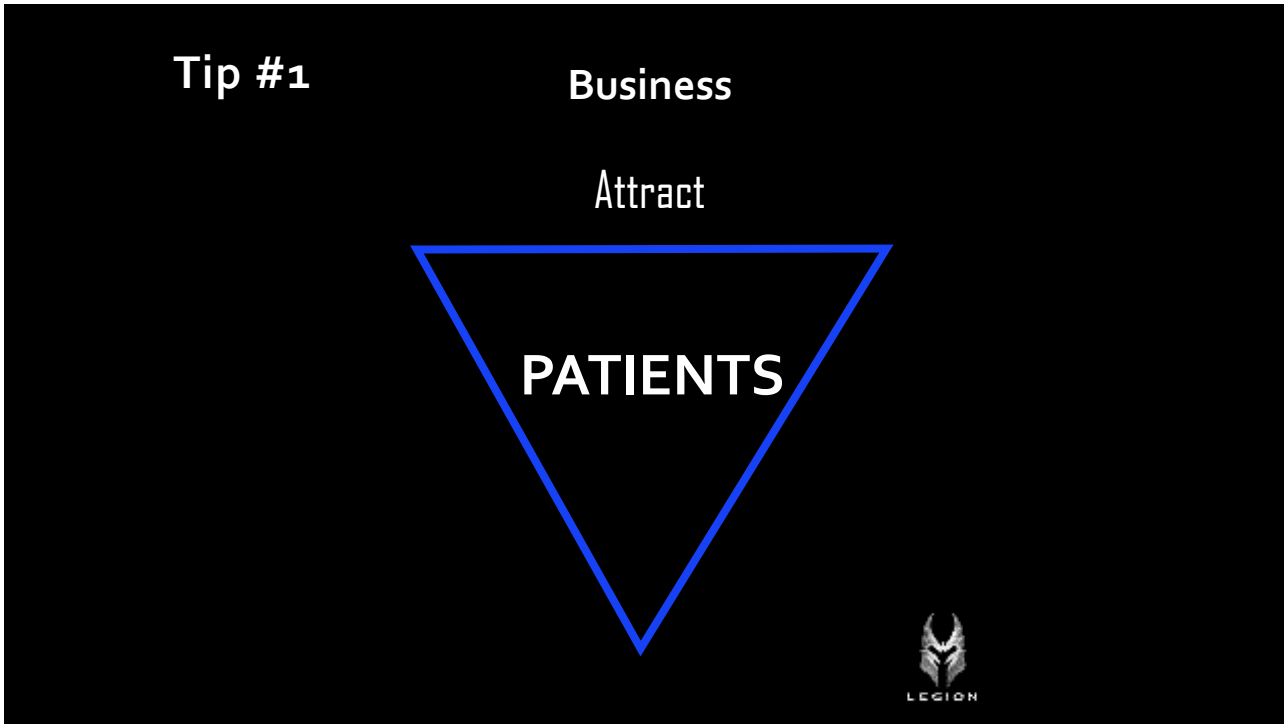

Business
PATIENTS
Deliver
LEGION

6


Tip #1
Business
Attract
PATIENTS
LEGION

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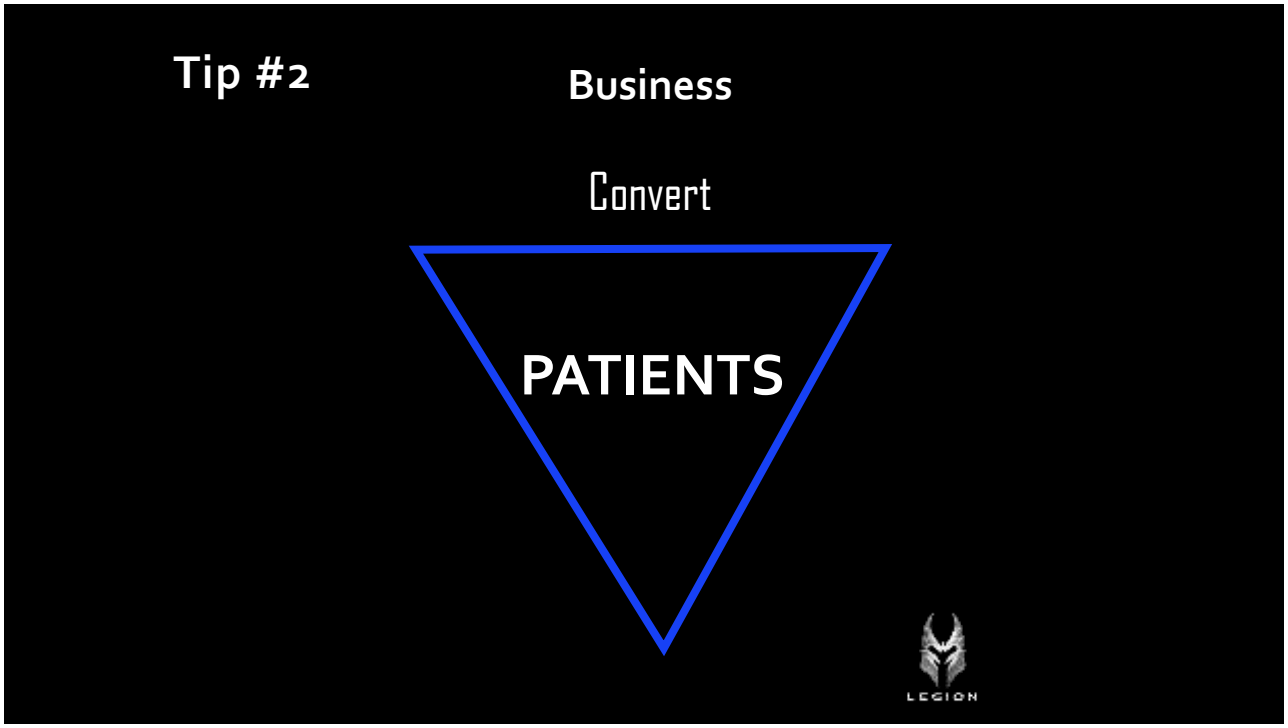
Tip #2
Business
Convert
PATIENTS
LEGION

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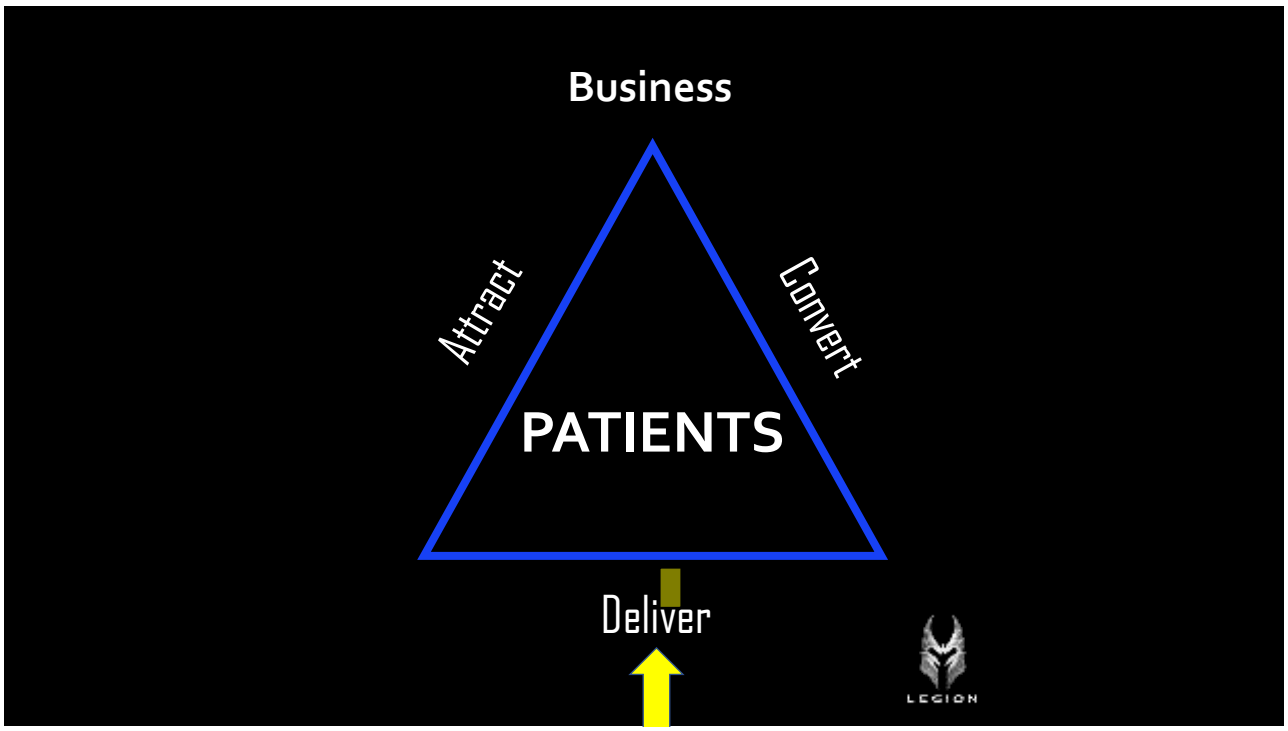
Business
Attract
Convert
PATIENTS
Deliver
LEGION

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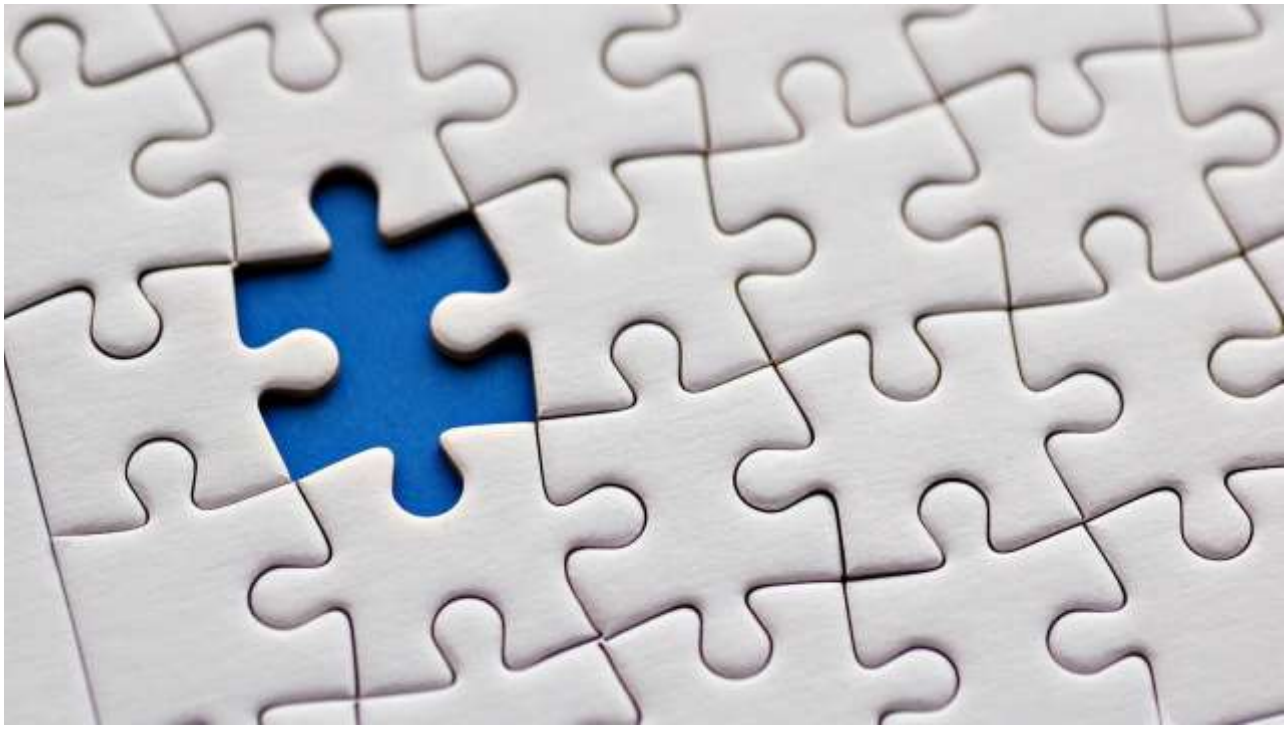

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CHANGE!!!

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Lecture Handout

www.DENTOOLZ.com

Digital Handouts, Products I Use & Special Offers

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Instagram Accounts:
@toddsnyderdds
@toddsnyder1
@legiondentist

Facebook: ToddSnyderDDS

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DIRECT MATERIALS

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

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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.

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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

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BIOACTIVITY IS FOR YOUR PATIENTS

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

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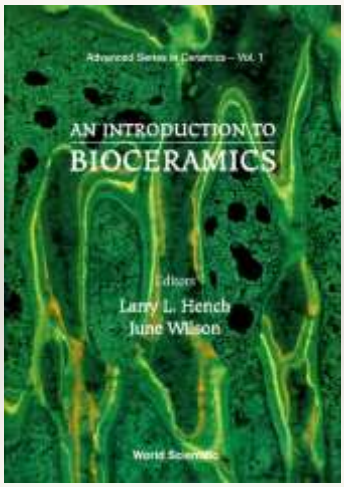
The most accepted definition of Bioactivity

- 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



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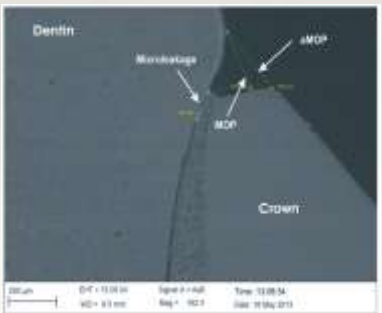
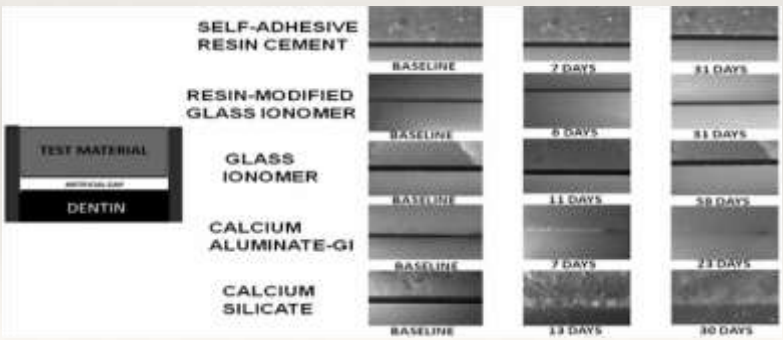
THE BIOACTIVE CONTINUUM

- THE DEFINITION HAS BEEN FURTHER DEVELOPED IN RECENT YEARS
- "A BIOACTIVE MATERIAL IS ONE THAT FORMS A SURFACE LAYER OF AN APATITE-LIKE MATERIAL IN THE PRESENCE OF (SALIVA OR A SALIVA-LIKE SUBSTITUTE)."
- JEFFERIES S.R. 2014





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WHY??

- Latest Marketing Buzzword OR True Patient Benefit?

WHERE??

WHEN??

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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

25

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.

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Delegated Scanning & Whitening Assistant

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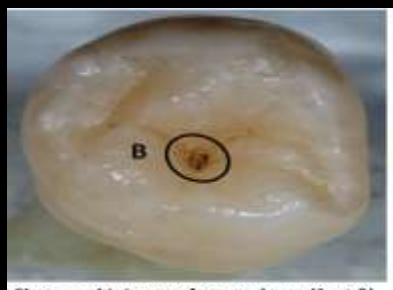
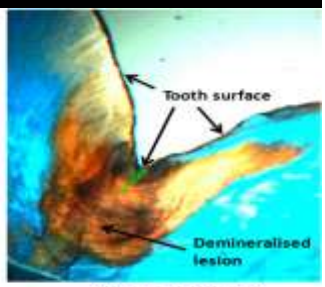
SENSITIVITY & SPECIFICITY STUDY: UNIVERSITY OF TEXAS OCTOBER 2012

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

28

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

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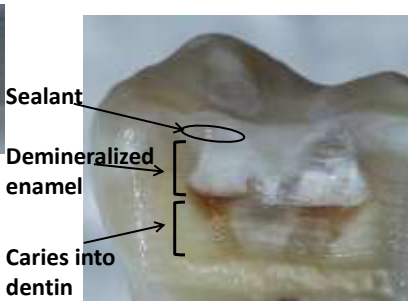
Detection of Caries Beneath Sealants

- 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%

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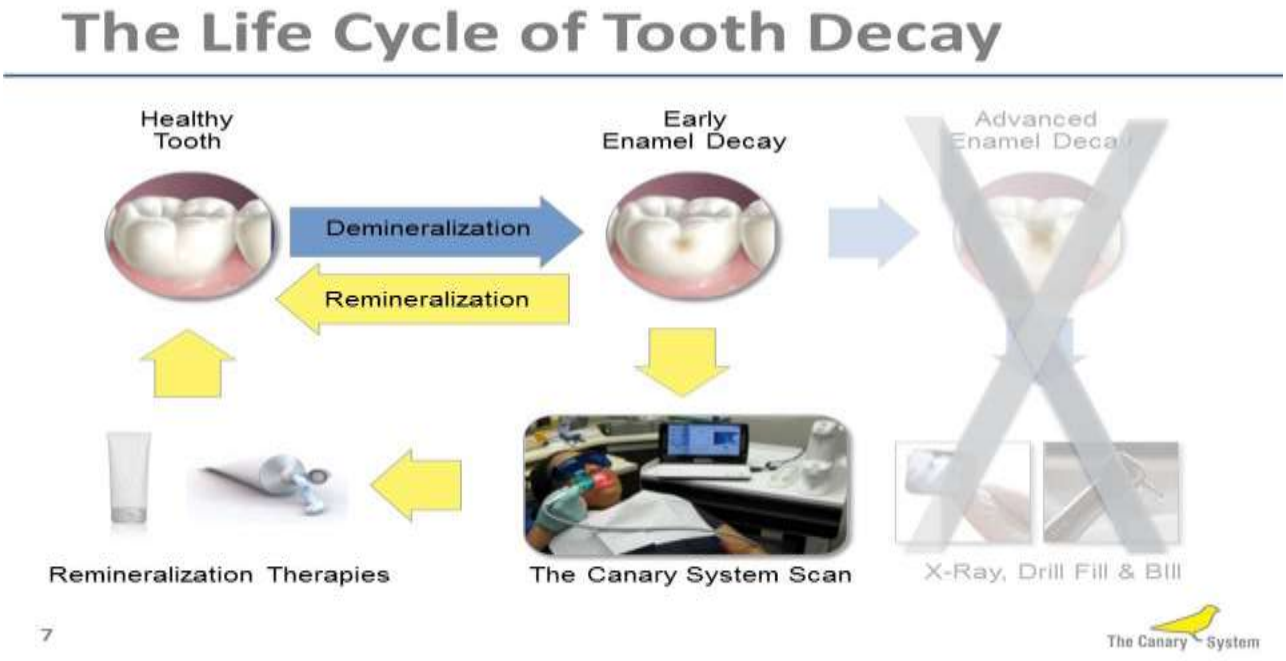

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After using diagnostic technology, what if you find something?

32

TOPICAL THERAPIES

- More caries resistant
- Remineralization

33

Minimally Invasive

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

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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

35

MI VARNISH™ WITH RECALDENT™ (CPP-ACP)

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

36

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

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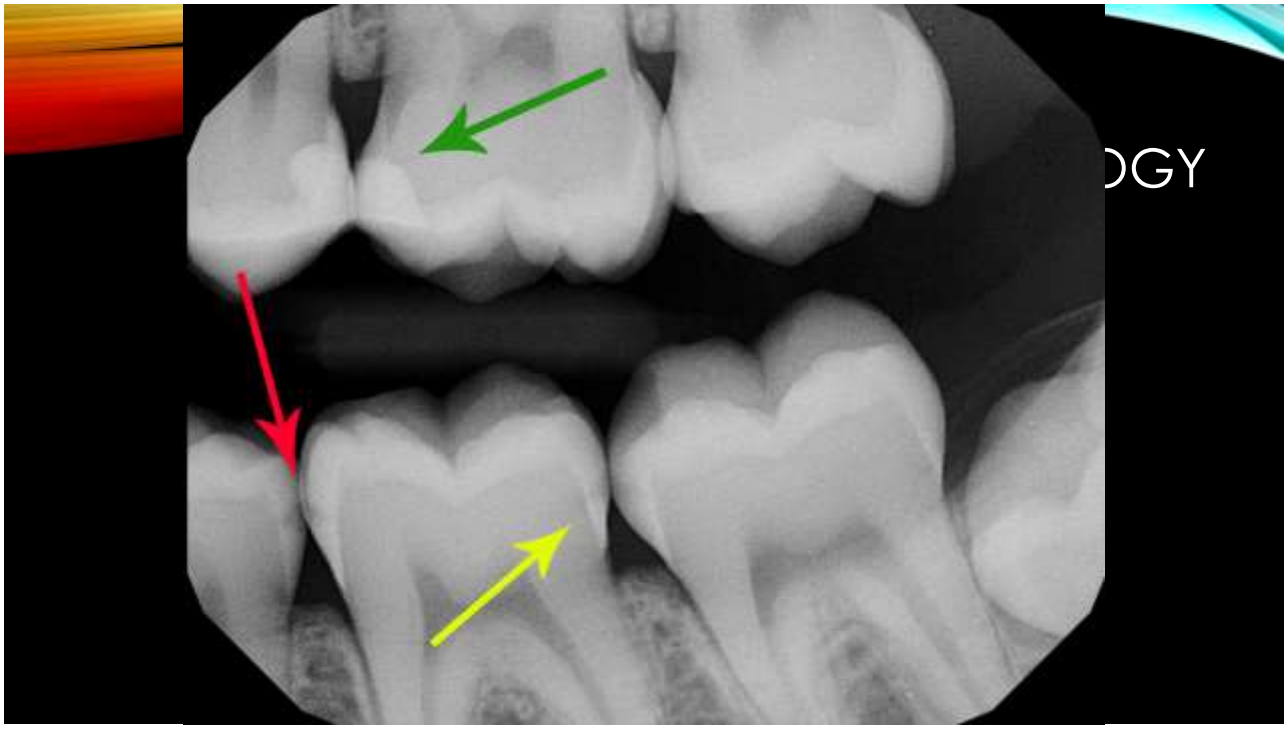

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CariVu Fiber Optic Transillumination

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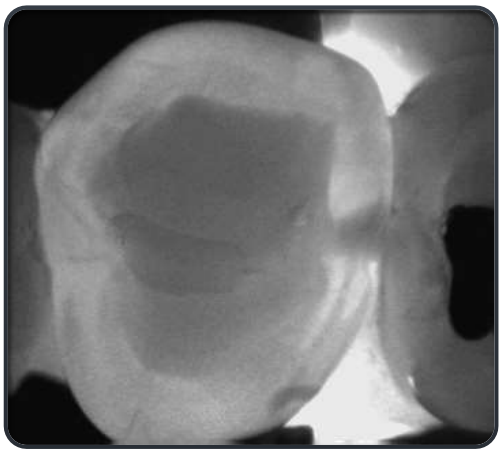
WHERE IS THE CAVITY



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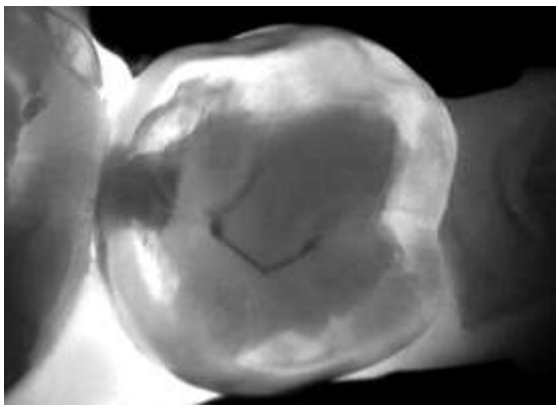

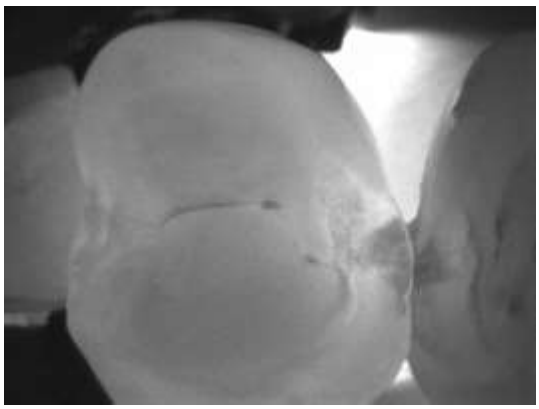

Early Diagnosis that can be Visualized

41

MINIMALLY INVASIVE DENTAL CARE

- Find Cavities & Demineralization Earlier
- Smaller, Easier to Place Fillings
- Saves Patients Tooth Structure
- Same CDT Fees Just Done Faster

EASILY DIAGNOSING 5X MORE DECAY

42

NEW CDT FOR 2017 CODE: D0600

D0600* Non-ionizing diagnostic procedure capable of quantifying, monitoring and recording changes in structure of enamel, dentin and cementum

43

FIND MORE, DO MORE, MAKE MORE…….

MSRP $5335
Your price $4500

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Huge Marketing Opportunity

- Remineralizing teeth
- Non Ionizing Diagnostic Tools (Canary/CariVu)
- Minimally Invasive Dentistry
- Health Product Sales
- Community Educational Programs
- Internet and Local Media Advertising

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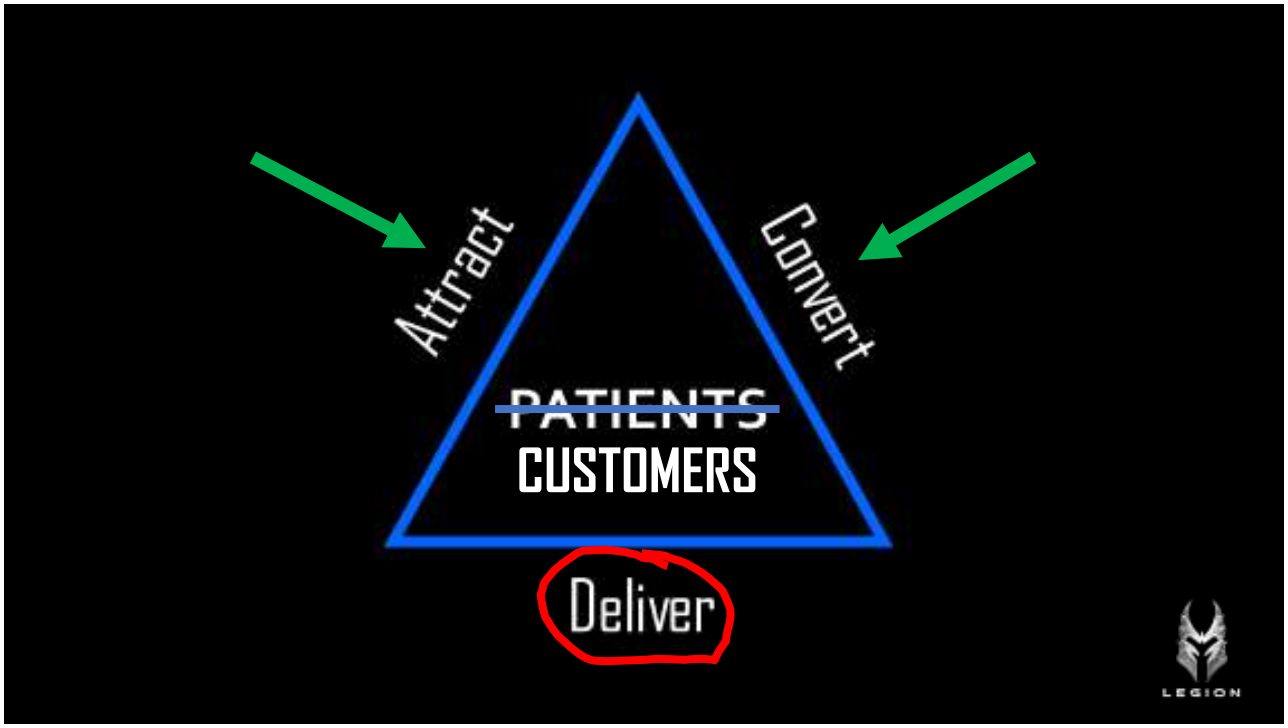
Attract
Convert
~~PATIENTS~~
CUSTOMERS
Deliver
LEGION

46

How will you diagnose this?
How will you prepare and treat this?

47

How are you restoring
?
these different preparations

48

Small Defects

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50

Flowables *(if you have good moisture control)*

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

…if not use a conventional glass ionomer

51

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®

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G-AENIAL BULK INJECTABLE – AVAILABLE SHADES

A1 & A2 shades available

53

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

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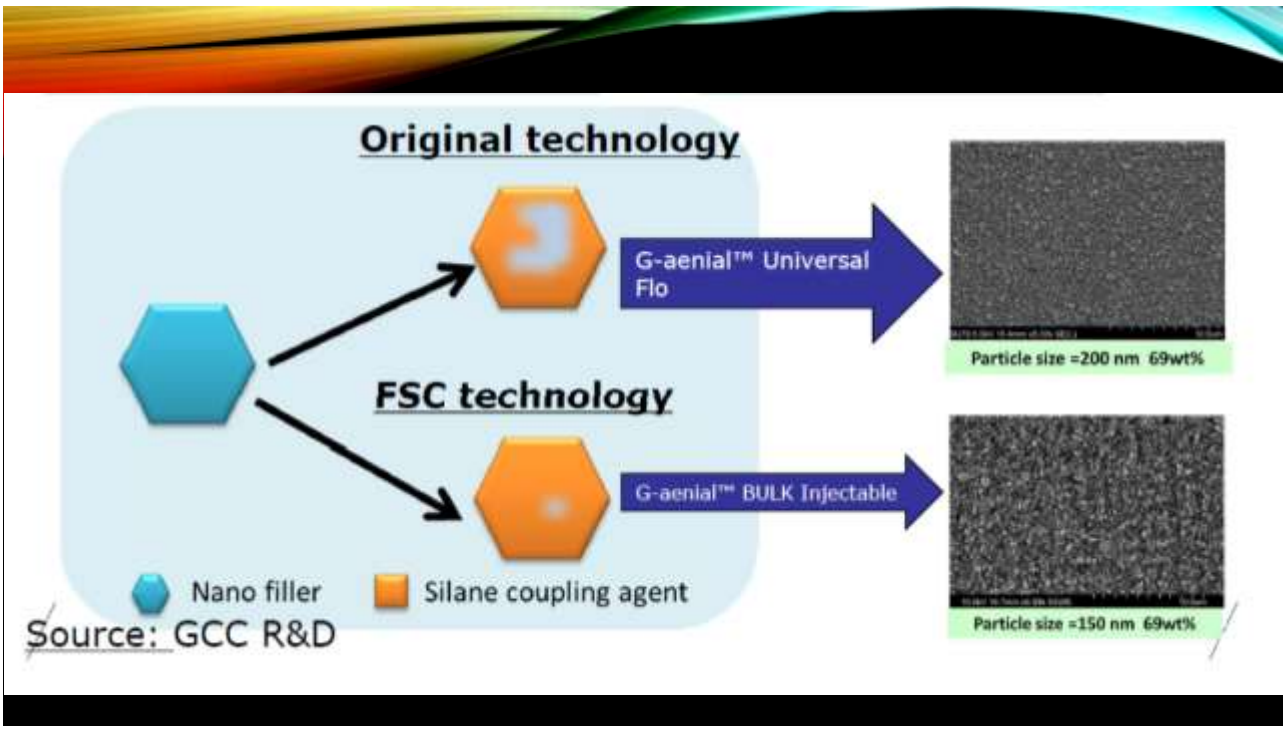

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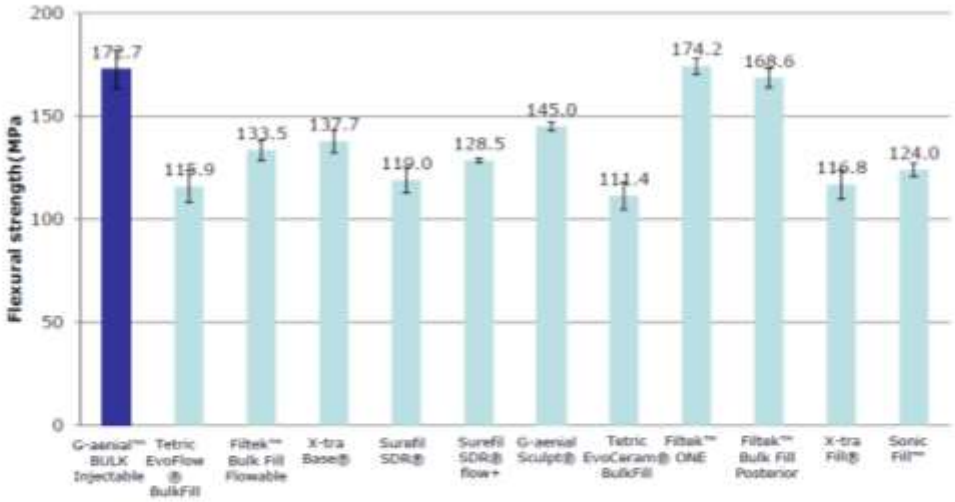

G-aenial™ BULK Injectable exhibits very high Flexural Strength, which translates to a **lower risk of chipping or fracture.**

Source: GCC R&D

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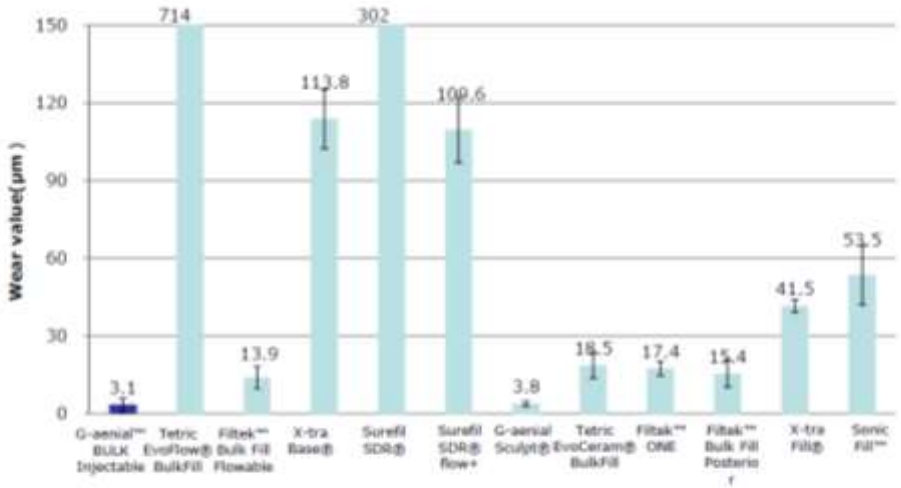

G-aenial™ BULK Injectable shows the highest wear resistance compared to the competitive set. This measure indicates that **the material will provide a highly durable and long-lasting restoration.**

Source: GCC R&D

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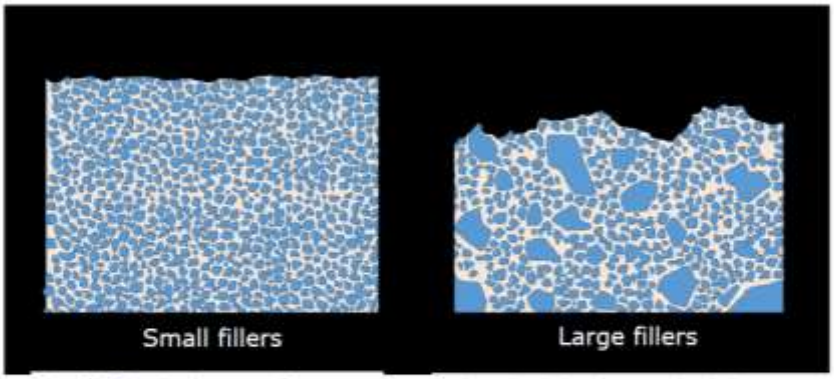
WEAR RESISTANCE

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

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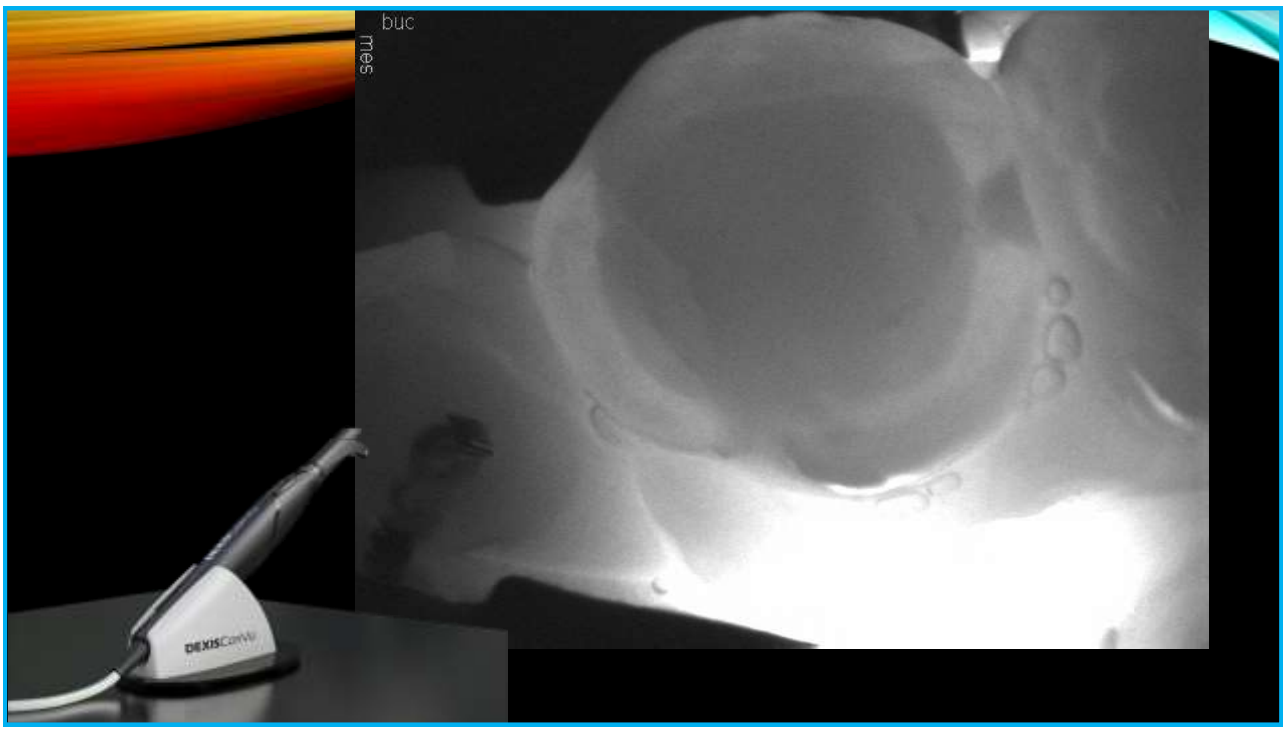

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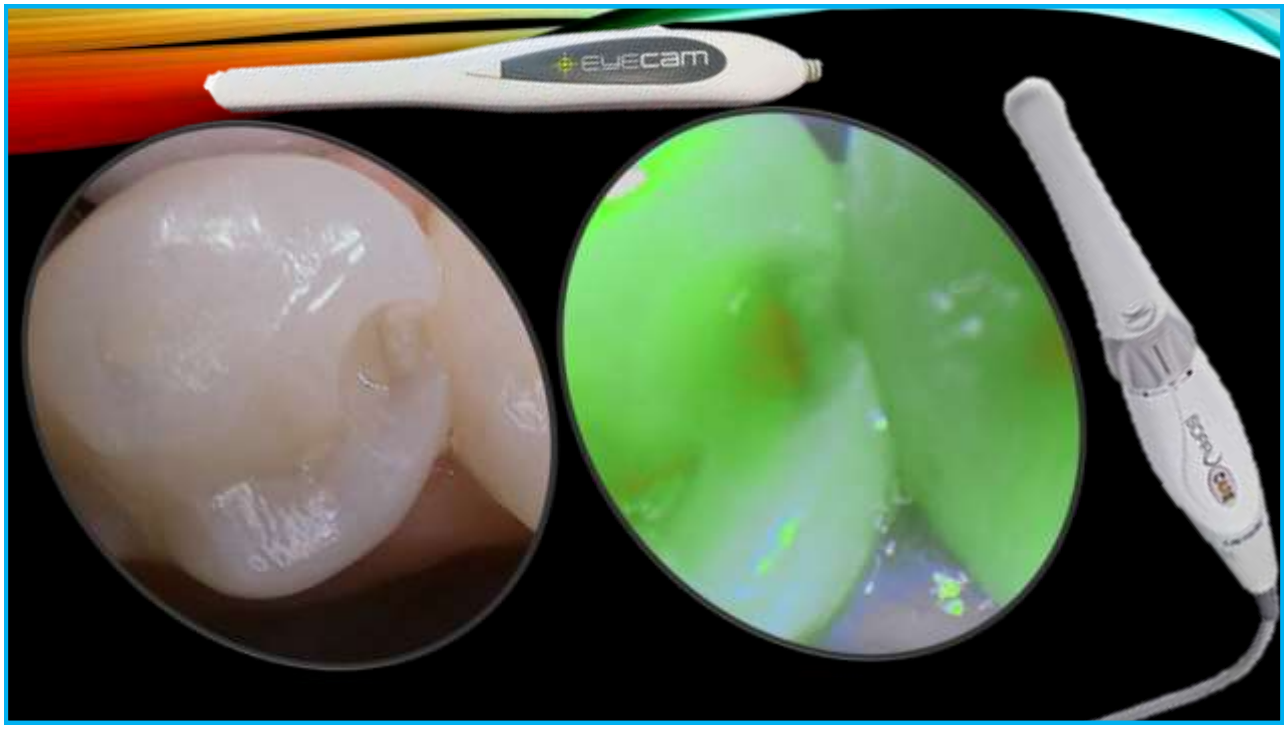

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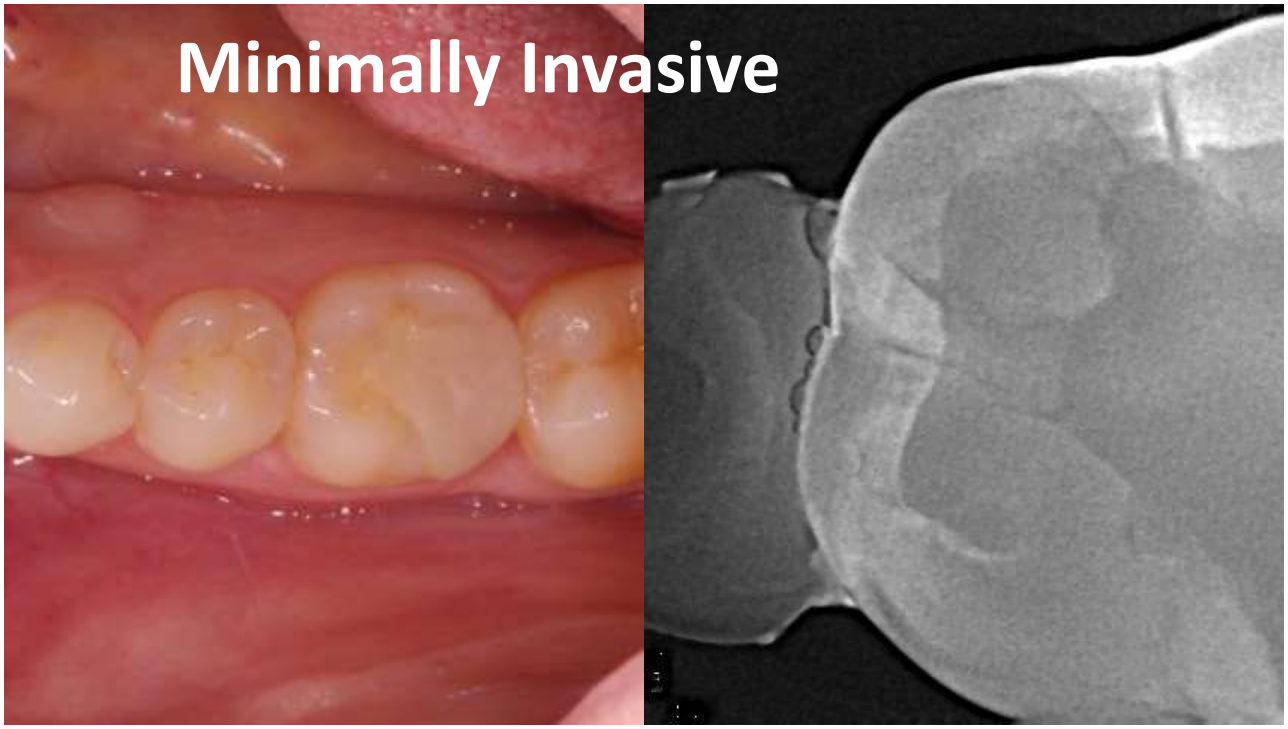

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Wedge Guards (TrioDent /Ultradent)

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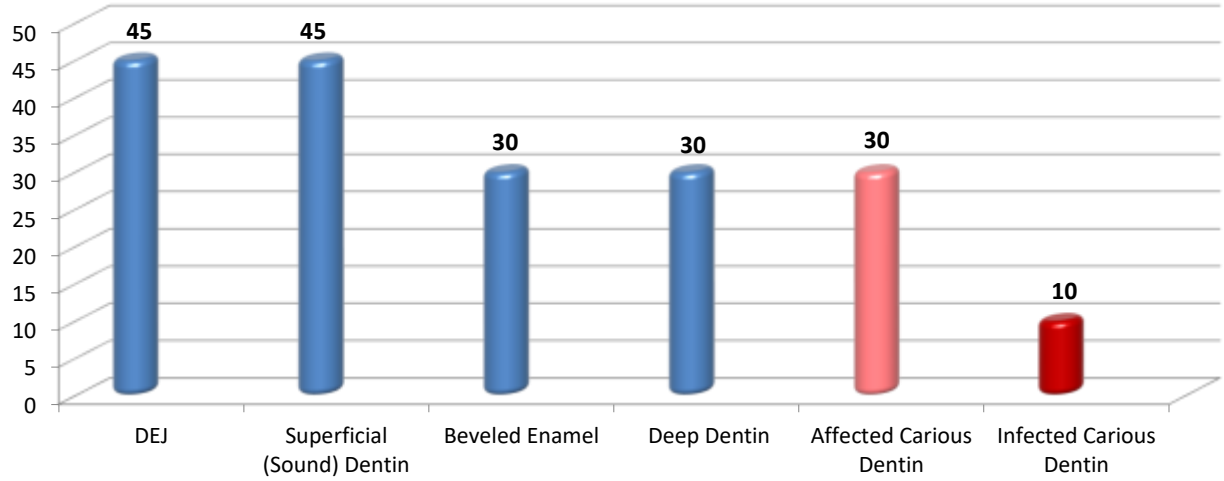
Bond Strengths Related To Type of Dentition



Irie m, suzuki k, watts dc, 2004, marginal gap formation of light activated restorative materials, affects of immediate setting shrinkage and bond strength. Dent Mat 18, 2002; 203-210

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Caries Indicator Dyes

- Ultradent-Seek*/Sable Seek*
- Roydent-To Dye For
- Kuraray-Caries Detector*
- ProOptions-Caries Indicator
- Danville-Caries Finder
- Pulpdent-Snoop
- Vista-Caries Indicator
- Ronvig-See It
- Patterson-
- Henry Schein-
- Pearson-

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Note Caries on Floor of 2nd Molar

73

Further Inspection Reveals More Caries

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Caries Removal Burs

- SS White
  - Single use
  - Polymer
  - Hardness
  - 5000-10,000 rpms
- Komet
  - Multi use
  - Ceramic
  - Hardness
  - 1000-1500 rpms

Article on the Comparison of Caries Removal Burs

75

Round Burs (#6)

Carbide (SS White)	CeraBur (Komet) 1,000-1,500rpm	SmartBurs II (SS White) 5-10,000rpm

J Adhes Dent 2011 Feb;13(1):7-22. doi: 10.3290/j.jad.a18443.
Current concepts & techniques for caries excavation & adhesion to residual dentin.
de Almeida Neves A, Coutinho E, Cardoso MV, Lambrechts P, Van Meerbeek B.

76

Handpiece Lubricants

77

Yiu CK, Hiraishi N, King NM, Tay FR. Effect of dentinal surface preparation on bond strength of self-etching adhesives. J Adhes Dent. 2008 Jun;10(3):173-82.

Higher bond strengths when using tungsten carbide burs with SE adhesives

Long term failure occurs at gingival margins and adhesive interfaces.

78

79

80

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

81

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

82

5mm
GLUMA
5ml
BISCO
ALL-BOND
UNIVERSAL

83

Adhesives
BISCO
ALL-BOND
UNIVERSAL
elec
CLEARFIL

84

- **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

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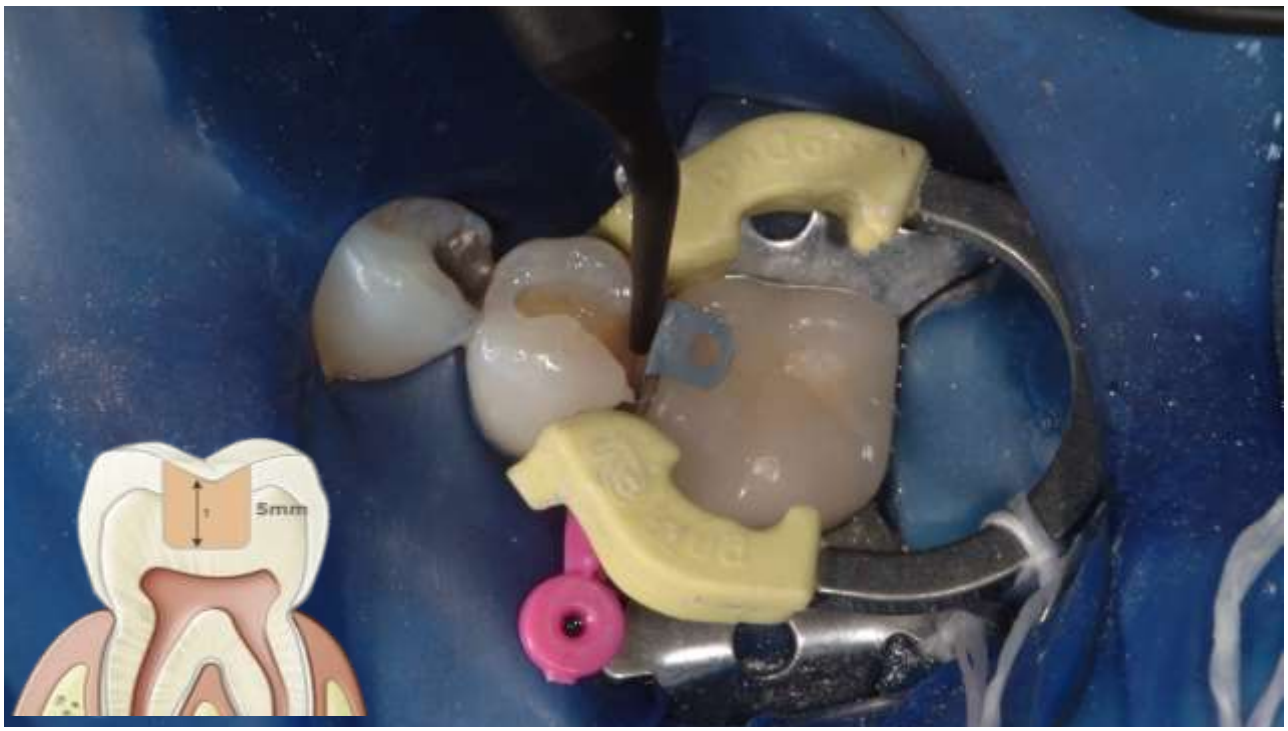

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G-aenial BULK Injectable

"operates like a flowable but performs like a restorative"

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

88

89

90

91

EVERX FLOW

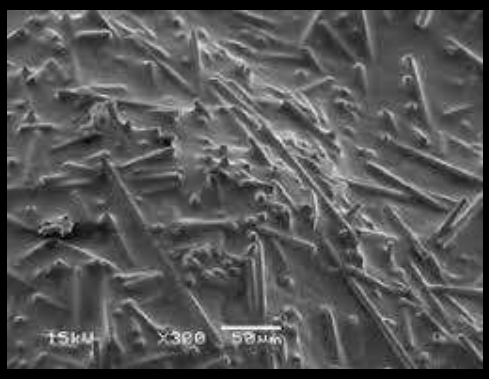
GC America

92

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



93

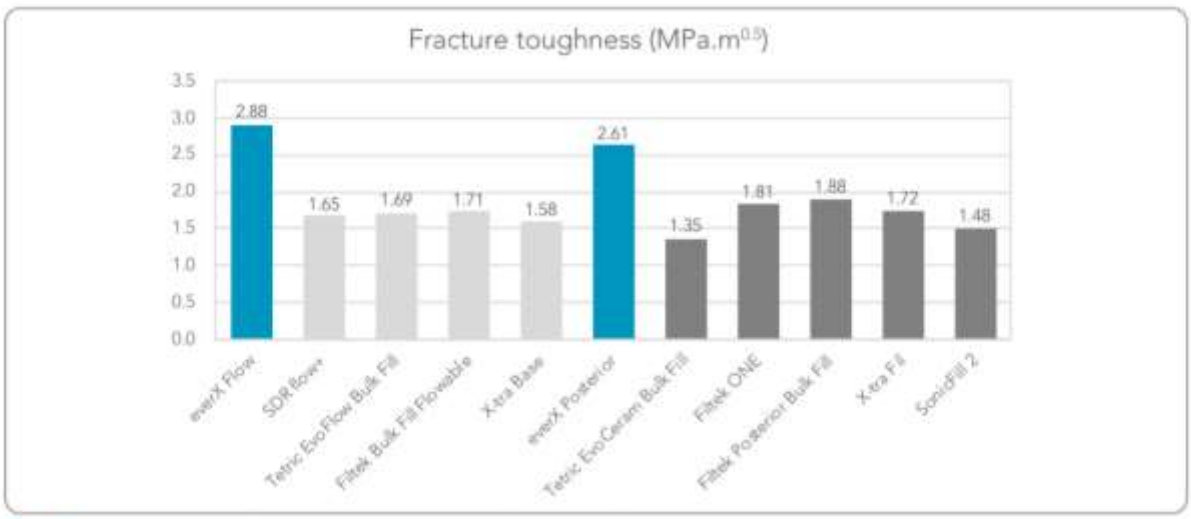


Figure 8: Fracture toughness of everX Flow and other paste & flowable bulk-fill composites.
Source: GCC R&D, Japan, 2018. Test method: as per ASTM E399-90 (1997). Data on file.

94

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.**

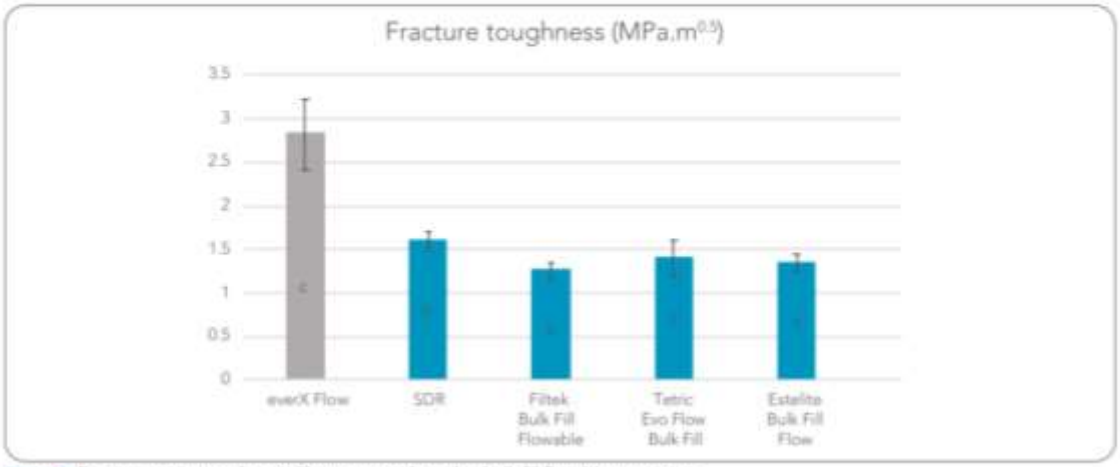


Figure 9: Fracture toughness of everX Flow compared to other bulk-fill flowable composites
Source: Characterization of a new fibre-reinforced flowable composite, Lassila et al, Odontology, 2018
The same letters inside the bars represent non-statistically significant differences (p>0.05) among the groups.

95

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

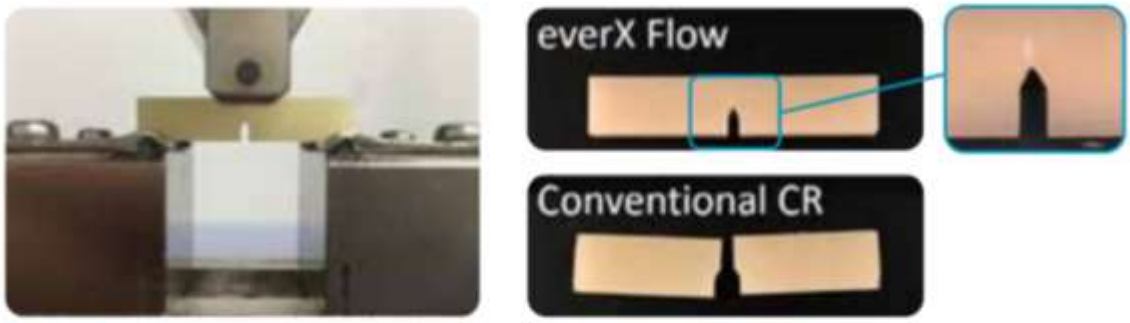


Figure 12: everX Flow sample arresting crack propagation
Source: GC R&D, Japan, 2019. Data on file.

96

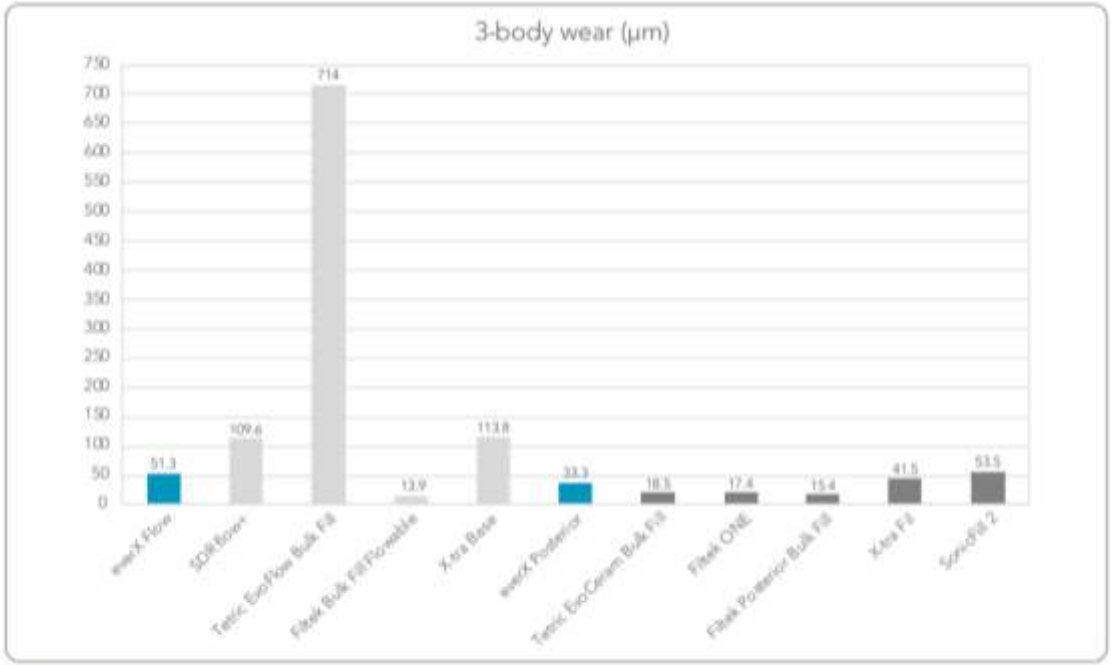
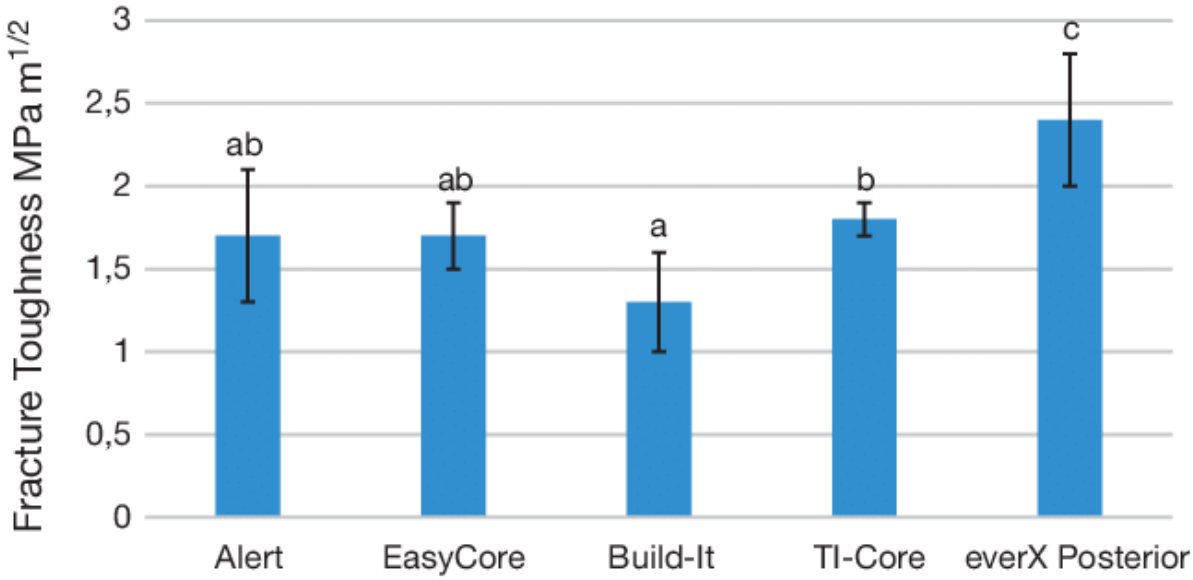


Figure 23 : Three-body wear of everX Flow compared to other bulk flowable & paste composites.
Source: GCC R&D, 2018. Data on file.

97


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

98

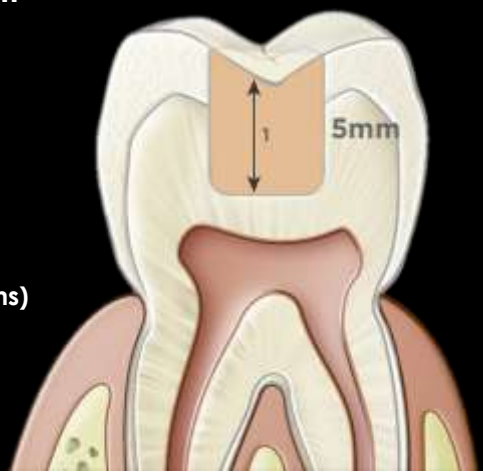
FSC TECHNOLOGY
• Full coverage Silane Coating
• Improves coupling between each fiber and the resin matrix
• Increases strength and toughness

FIBRES PREVENT AND STOP CRACK PROPAGATION
GC
Conventional composite substructure - the crack propagates through the composite obturation
Posterior exerX substructures - crack propagation is stopped

99

LIGHT CURED BULK FILL COMPOSITES

- Long term research?
  - **Dentin & Enamel Replacement**
    - **Requires one layer**
    - **1.6%-2.4% vol. shrinkage**
    - **2.3-2.8mpa shrinkage stress**
  - **Bonding agent**
    - **(2 bottle highly filled system)**
  - **Self Cured BulkFill**
    - **Danville Materials (Zest Dental Solutions)**
    - **Coltene**
    - **Pulpdent**
    - **Parkell**



116

BULK-FILL RESEARCH

- August 2017 American Journal of Dentistry
- https://www.researchgate.net/publication/320065147_Stress_distribution_of_bulk-fill_resin_composite_in_class_II_restorations
- December 2016 American Journal of Dentistry
- https://www.researchgate.net/publication/316645293_The_new_generation_of_conventional_and_bulk-fill_composites_do_not_reduce_the_shrinkage_stress_in_endodontically-treated_molars

119

Operative Dentistry

Today's resin-based composite materials are excellent. The bulk-fill concept is desired by many dentists; however, *CR research shows adequate depth of cure deeper than 3 mm remains questionable for most brands of resin composites and most resin curing lights.* Concepts for making Class II resin-based composites predictable and profitable were published in *Clinicians Report* February 2014.

These CRA research results agree with Dr. Tagami's results on SonicFill. Tagami stated SonicFill cures to only 70% on bottom at 4 or 5mm depth of cure.

121

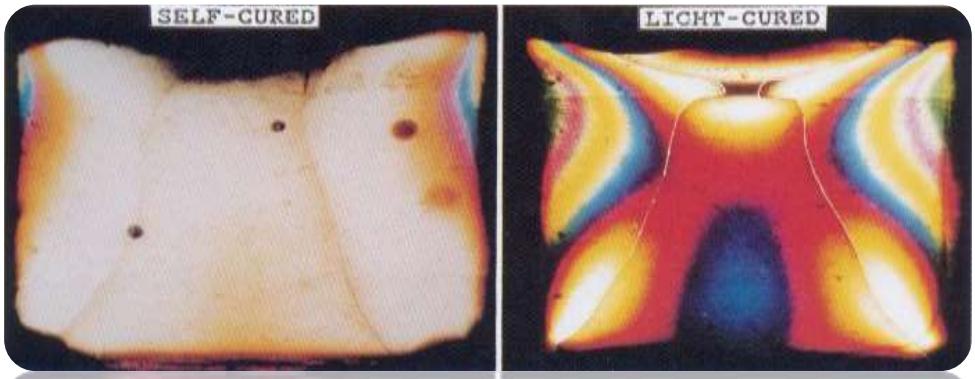
CRA questions the ability for most practitioners to place bulkfill materials properly in addition to getting adequate curing.

Curing bulk fills remains a question

Test your light output and practice with your materials

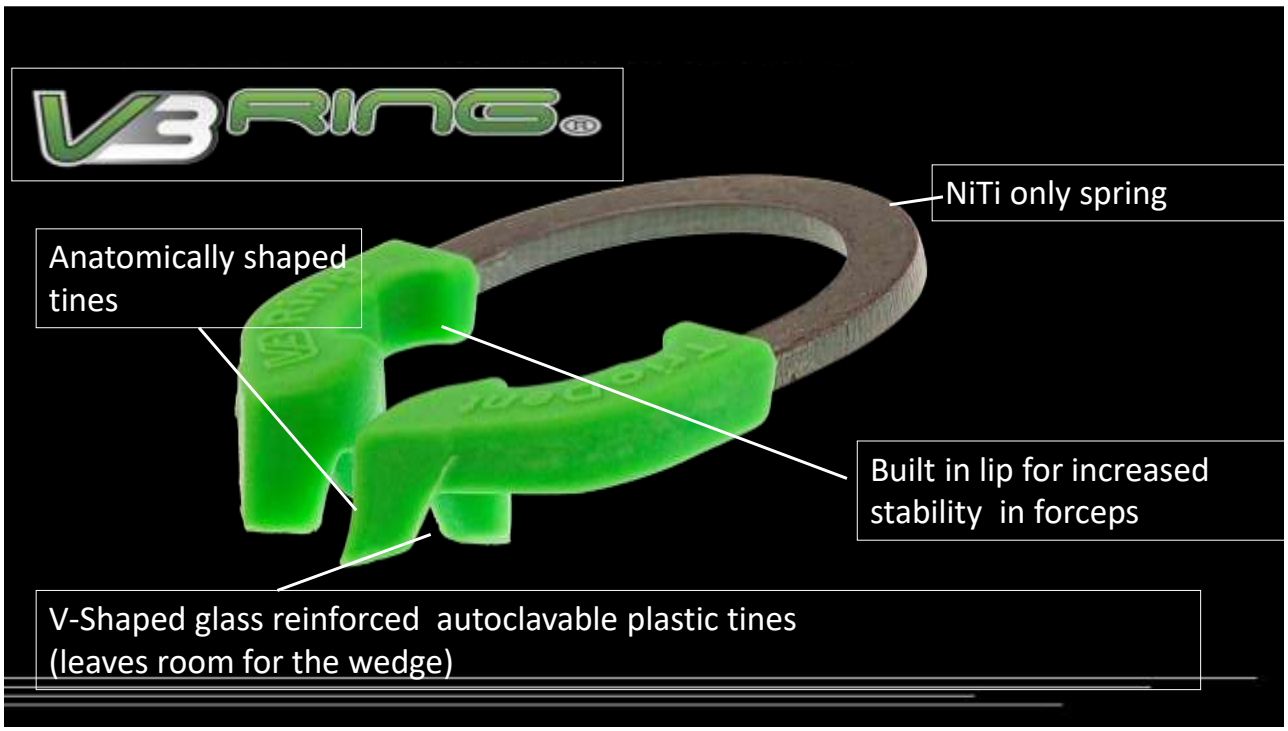
122

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

123



124

V3 RING®

Universal V3 Ring *Narrow V3 Ring*

TrioDent has developed *Narrow V3 Ring* in addition to the *Universal V3 Ring* to ensure ideal separation on smaller teeth.

125

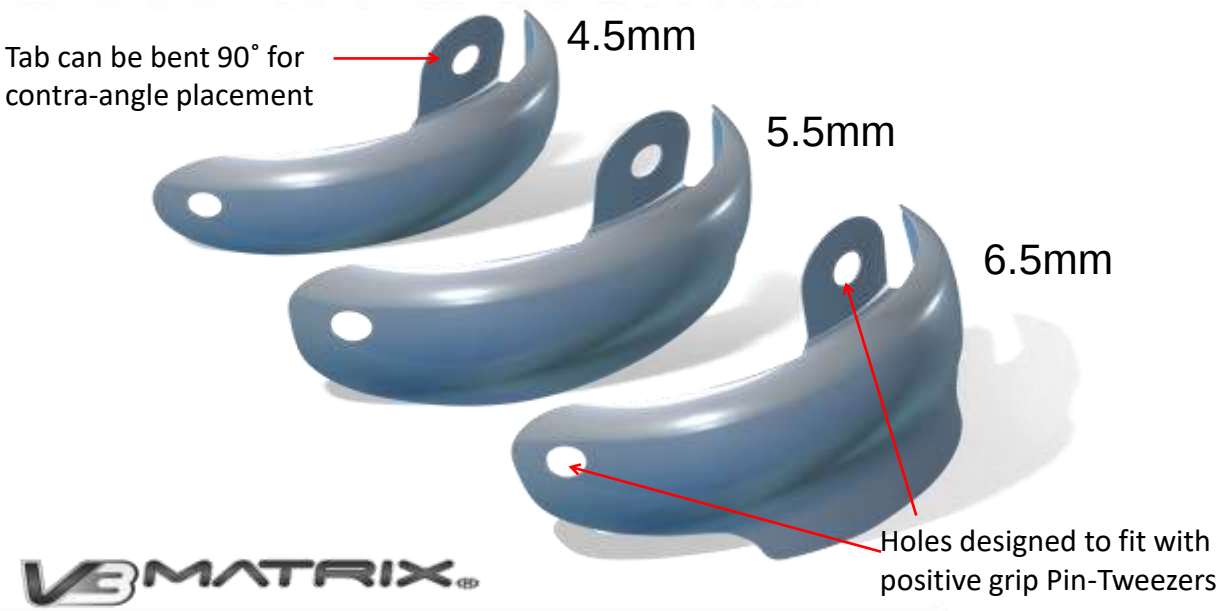
REALITY Five Star Award ★★★★★ REALITY'S CHOICES

Wave Wedge

Hole to fit with positive grip Pin-Tweezers

Inter-proximal contour for a better gingival seal and V-shaped concavity to protect the papillae

127



128

V3 SYSTEM by TrioDent

129

by TrioDent

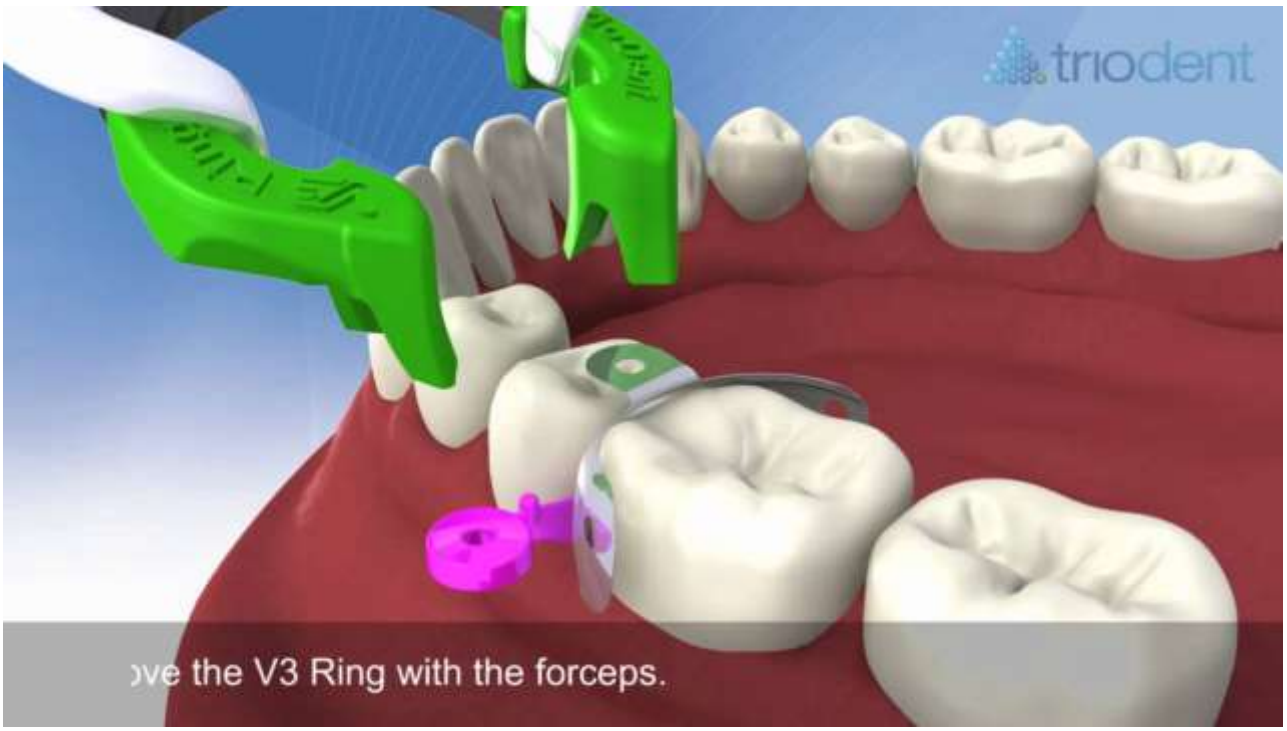
130

by TrioDent

131

by TrioDent

132



133

triodent

134

3.5mm 4.5mm 5.5mm 6.5mm 7.5mm

135

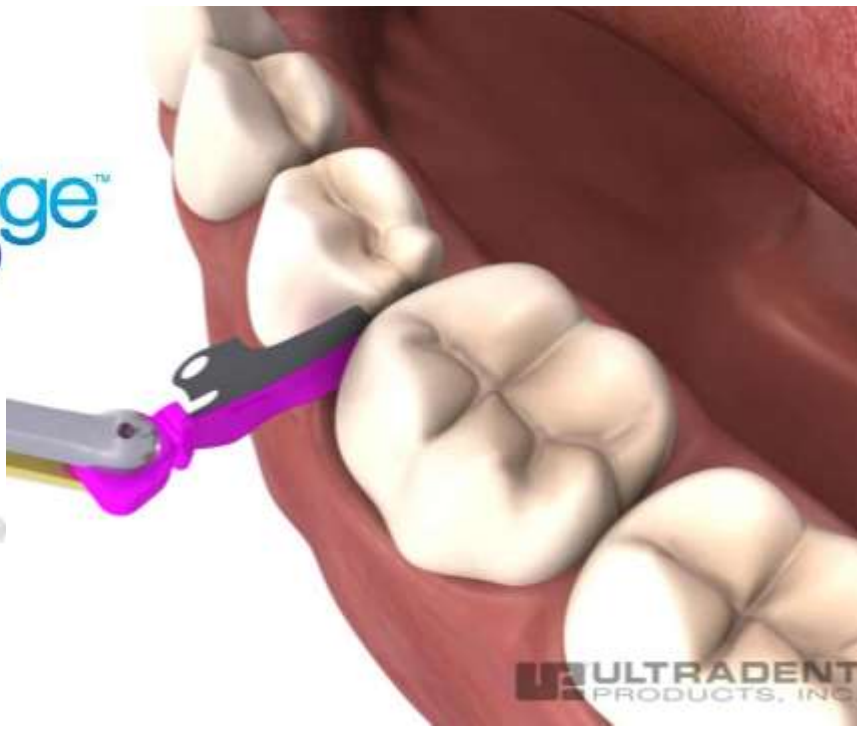
SuperCurve

Super snug, non-stick

- Micro-thin – 35-38µ (0.0014”)
- Color-coded for easy recognition and re-ordering
- Matrix very stable after placement
- Less risk of catching matrix wings during ring placement, especially with a back-to-back MO/DO

136

wedge™ GUARD
interproximal tooth shield



137

138

139

Palodent Plus-Dentsply

Identical except for color

140

Dentsply Palodent Plus System

-Nickel Titanium sectional rings
-Wedge Guards
-EZ Coat matrices

141

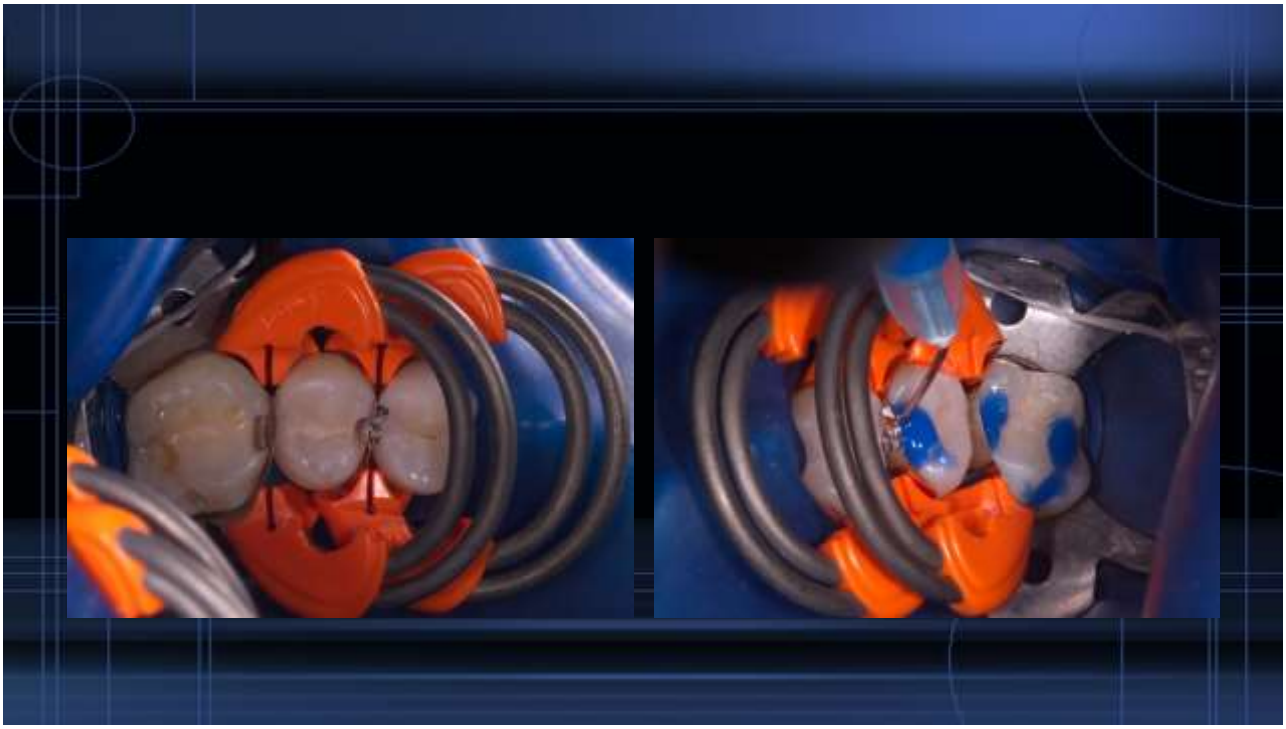
Clinician's Choice

152

153

154

155



156

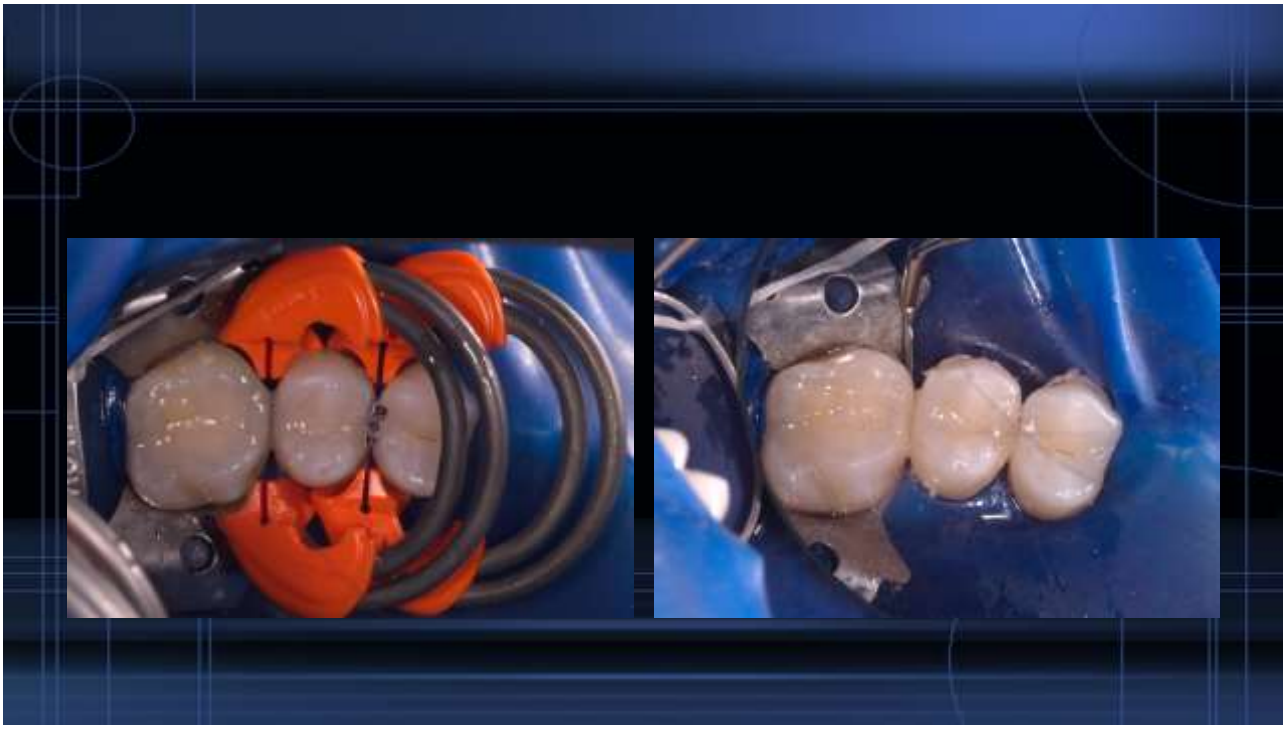
157

Evanesce flow
flowable restorative

158

nano-enhanced
Evanesce
universal restorative

159



160

161

Composite Ninja

162

Composite Ninja

163

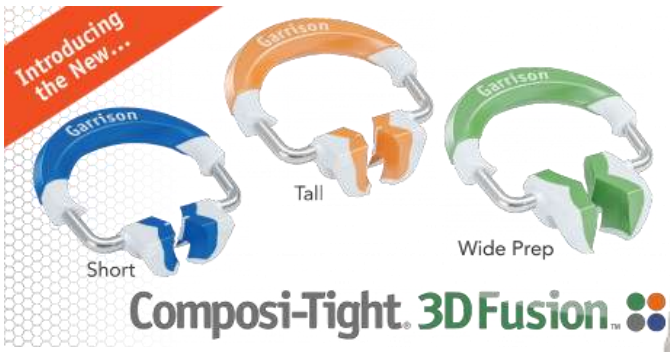
Composite Ninja

164

165

Garrison Dental 3D Ring System

166



168

169

Problem

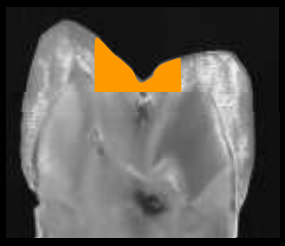
Varying tooth substrates

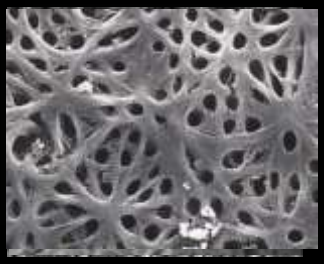
Enamel & Variable Dentin Bonding

170

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.

171

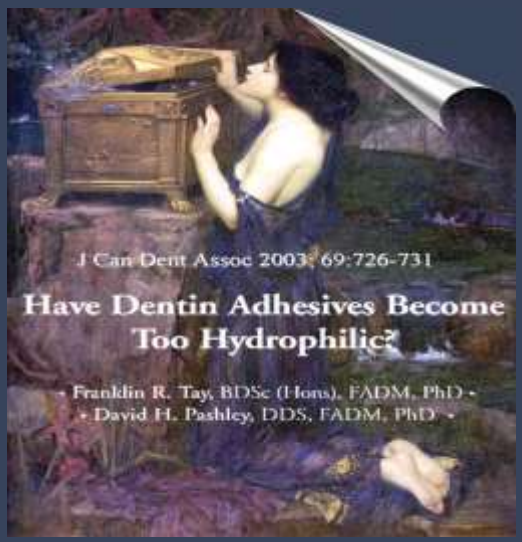
(RFA-DE-10-004)
"Tooth-colored resin restorations have an average replacement time of 5.7 years due to secondary caries precipitated by bond failure."

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

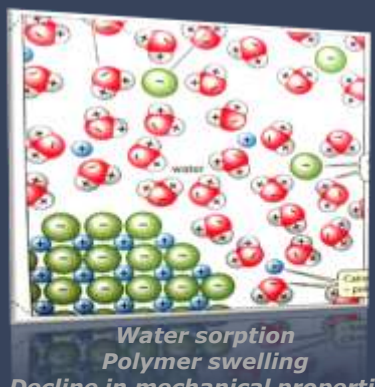
172

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

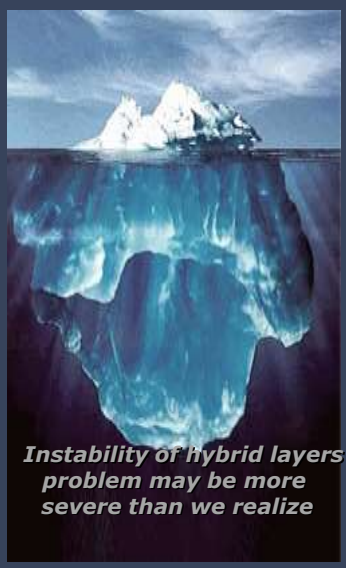


Water sorption
Polymer swelling
Decline in mechanical properties
Leaching of hydrolyzed resin components

173

Factors that compromise bond durability in restorative dentistry

Hydrophilic dentin bonding

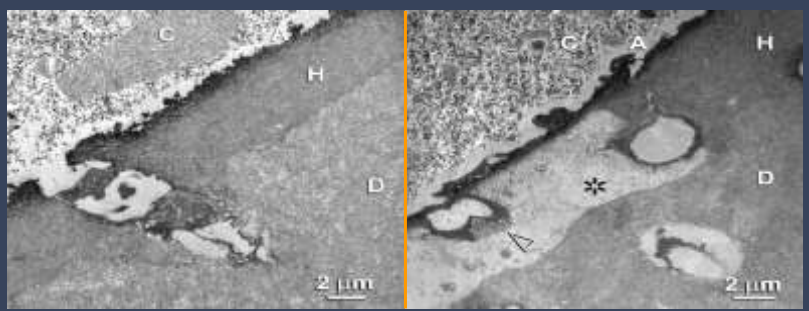


Instability of hybrid layers problem may be more severe than we realize

RESEARCH REPORTS
J Dent Res 2005; 4:741-746

J. Hebling[1], D.H. Pashley[2], L. Tjäderhane[3], and F.R. Tay[2,4]*

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

174

ⓘ *Factors that compromise bond durability*

Hydrophilic dentin bonding

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

D.H. Pashley[1*], F.R. Tay[2], C. Yiu[3], M. Hashimoto[4], L. Breschi[5], R.M. Carvalho[6], and S. Ito[4]

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)

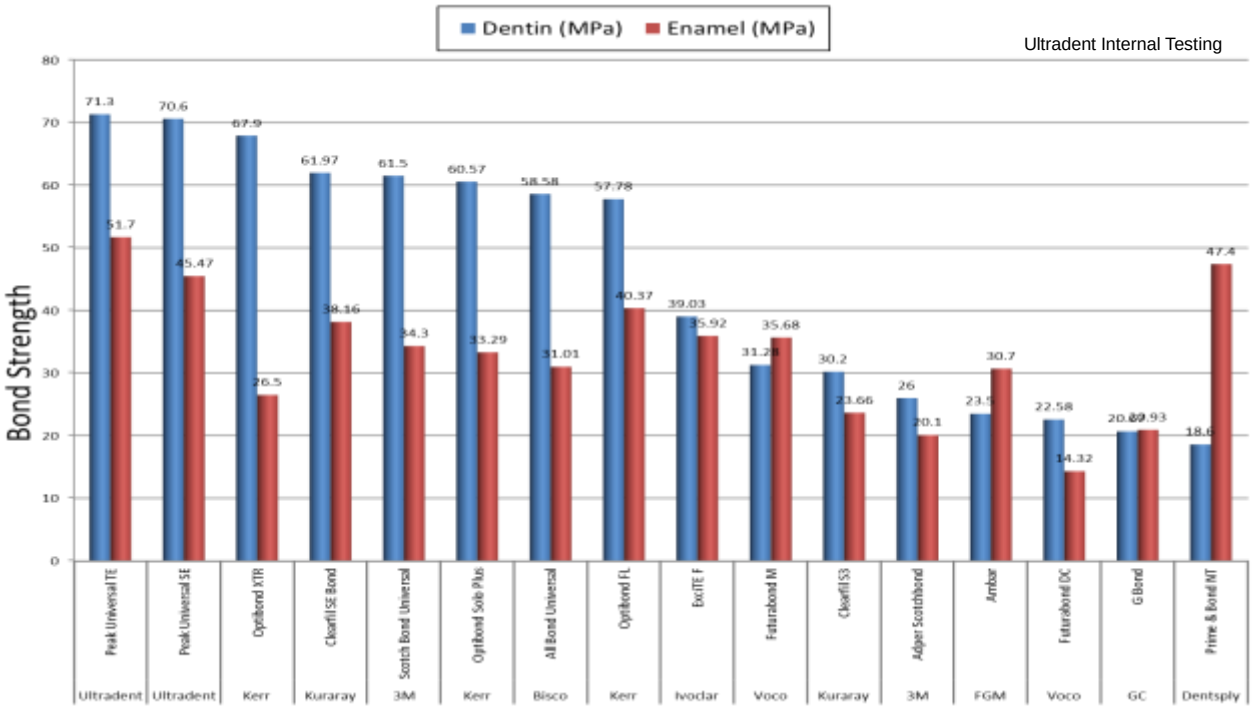
175

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.

176


Dentin (MPa)
Enamel (MPa)
Ultradent Internal Testing
Bond Strength
0
10
20
30
40
50
60
70
80
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
31.28
35.68
30.2
23.66
26
20.1
23.5
30.7
22.58
14.32
20.8
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 S3
Adper Scotchbond
Amber
Futurabond DC
G Bond
Prime & Bond NT
Ultradent
Ultradent
Kerr
Kuraray
3M
Kerr
Bisco
Kerr
Ivodar
Voco
Kuraray
3M
FGM
Voco
GC
Dentsply

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Adhesives
BISCO
ALL-BOND
UNIVERSAL
elec
OptiBond
XTR
CLEARFIL
Universal Bond Quick

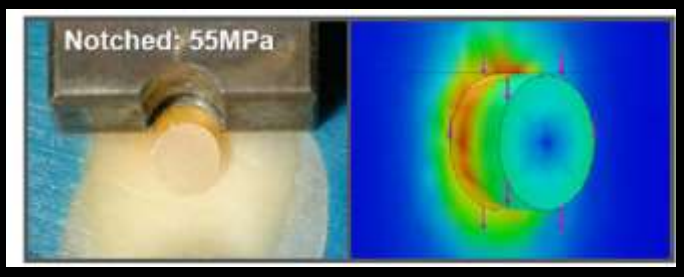
178

•Courtesy Pacific University (Dr Marc Guisberger)

179

INSTRON

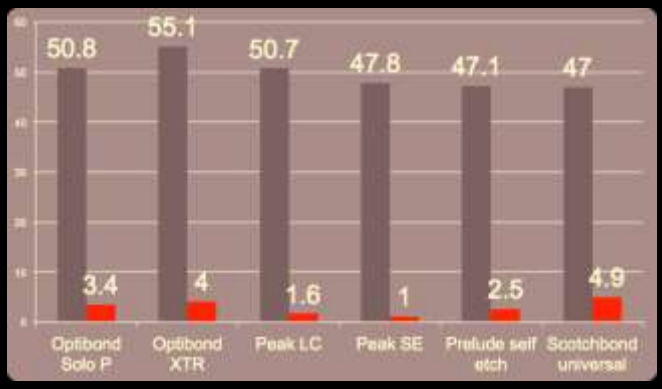
- Ultra Tester (Ultradent)
- Ultra Jig (Ultadent)



180

Courtesy Pacific University (Dr Marc Guisberger)

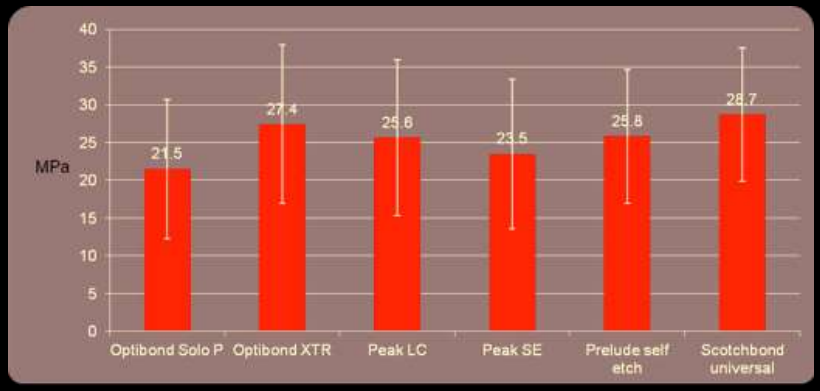
SHEAR BOND TEST RESULTS - 2012



181

Courtesy Pacific University (Dr Marc Guisberger)

SHEAR BOND TEST RESULTS - 2012



182

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

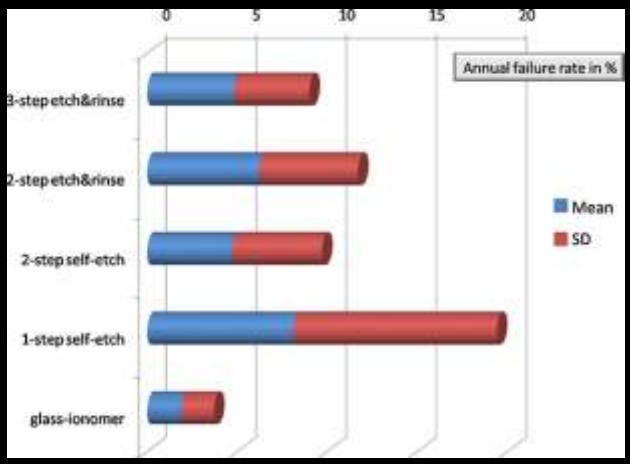


Fig. 15 – Graph representing the mean annual failure rates per adhesive class, determined according to a systematic review of Class-V clinical trials of adhesives during the period 1998–2004 [2].

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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.

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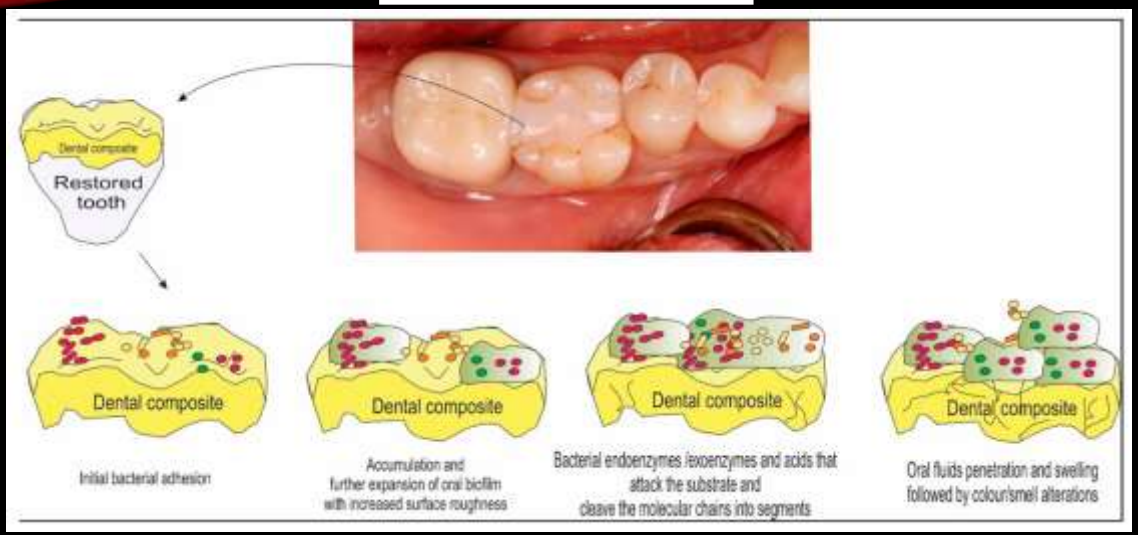
DRAWBACKS OF ANY COMPOSITE RESIN

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

185

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

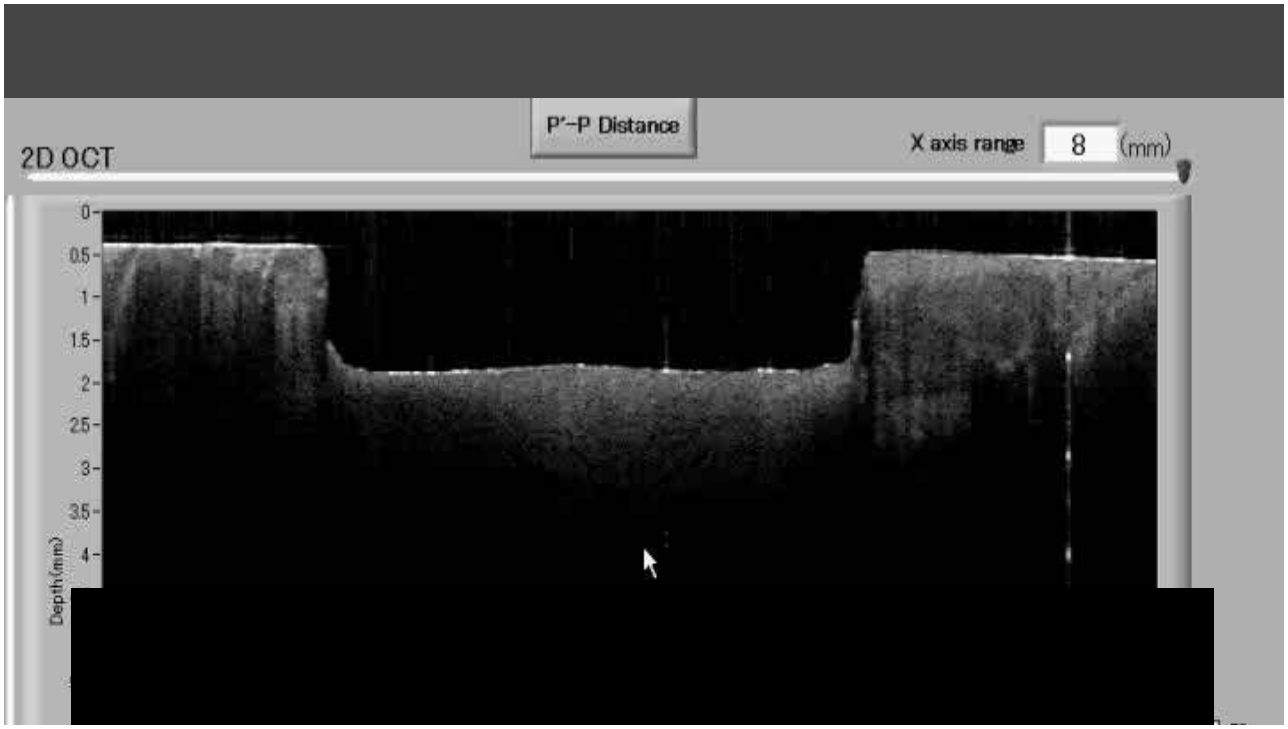
187

"C-FACTOR"

Base/ Lining

Excellent Flow & Handling

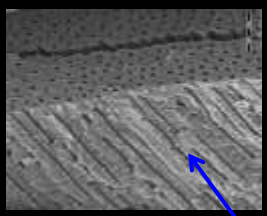
188

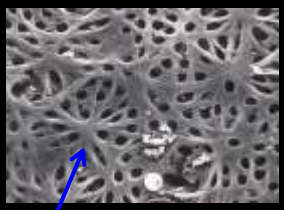


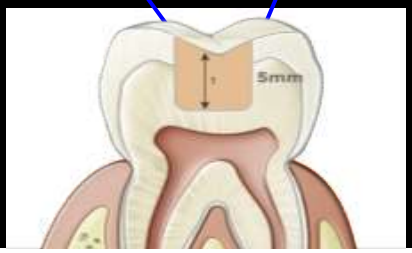
189

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

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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.

191

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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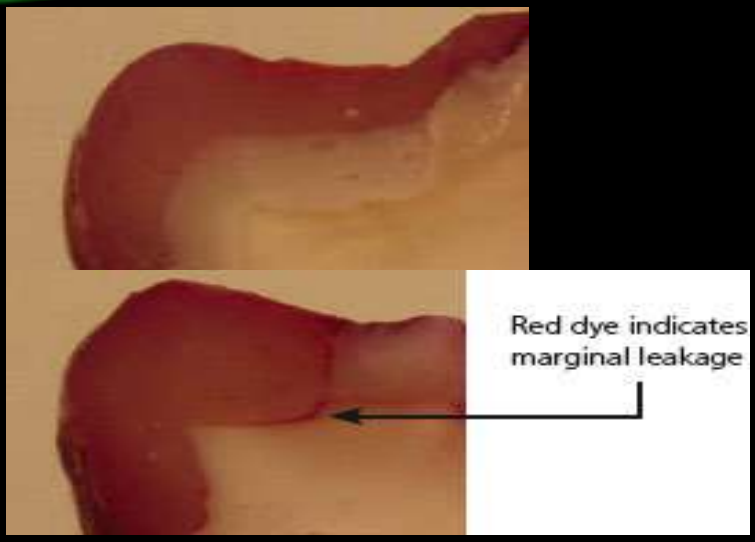
GLASS IONOMER SANDWICH



- 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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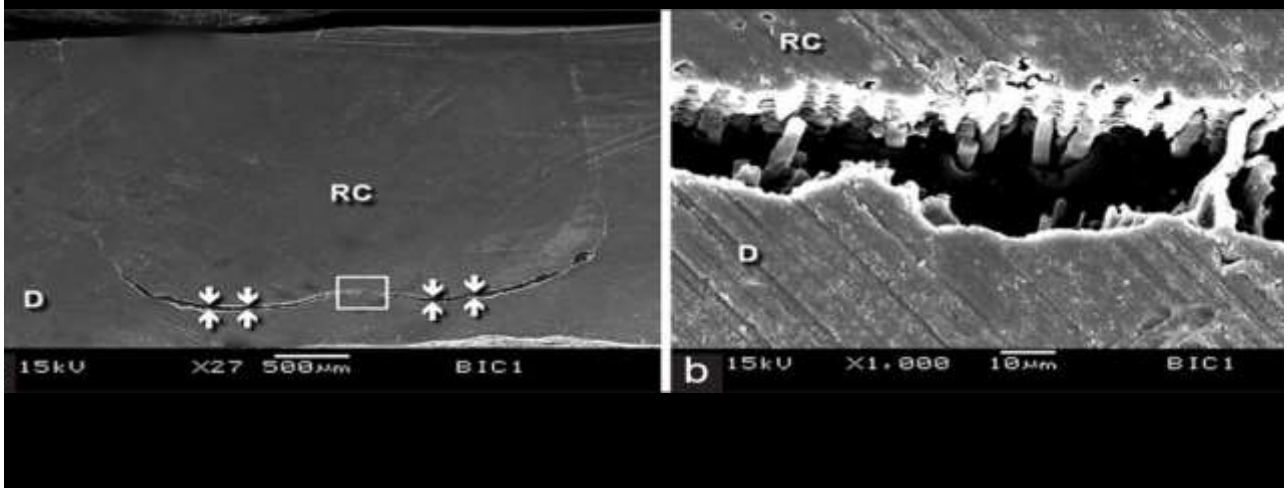
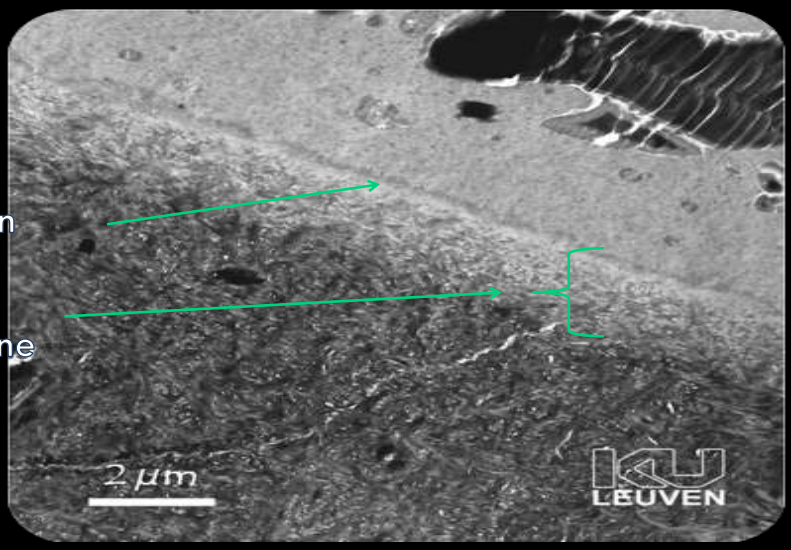
RESIN TO DENTIN HYBRID ZONE



195

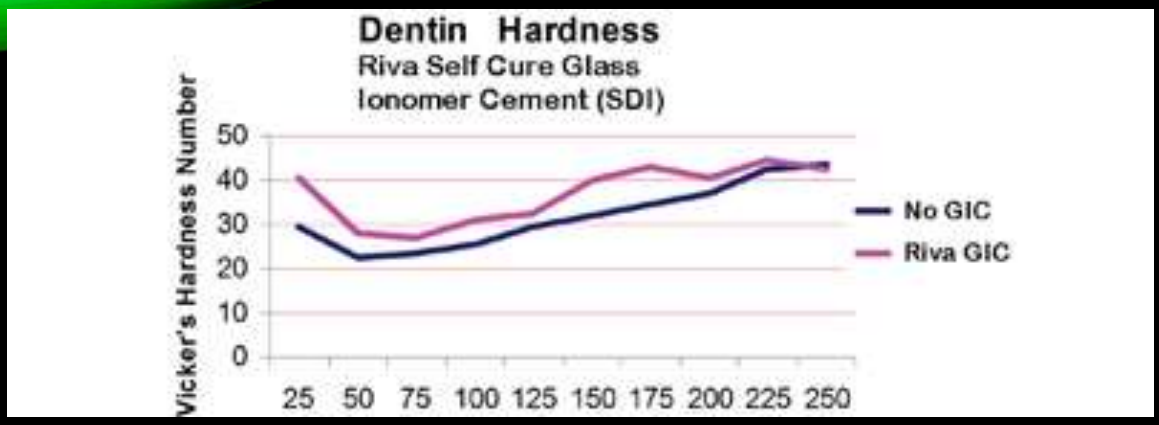
GLASS IONOMER INTERFACE



Interface Analysis (TEM)

CARDOSO et al. J Dent 2010

196



BENEFITS OF A BIOACTIVE MATERIAL CONTACTING THE DENTIN

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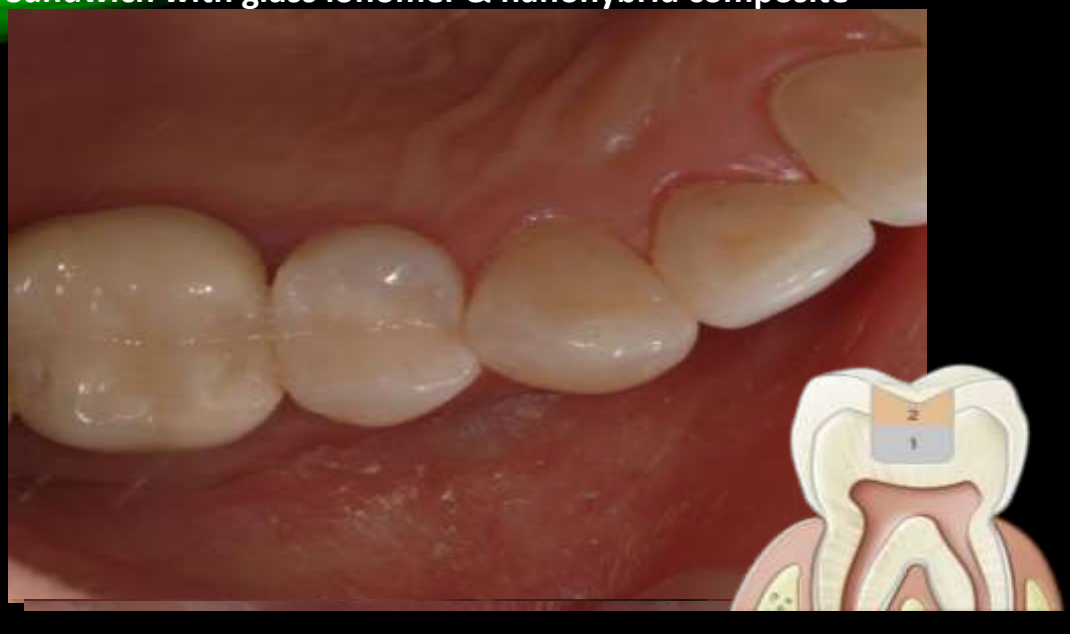
Open Sandwich with glass ionomer & nanohybrid composite



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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.

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Gordon J. Christensen

Clinicians Report Reprint

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 at-risk areas of the oral cavity. They have improved properties, like thicker consistency, faster set times, and greater strength. They deserve strong consideration for future use.

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

200

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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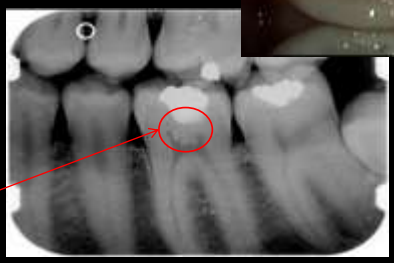
GLASS IONOMER MATERIALS

- 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

202

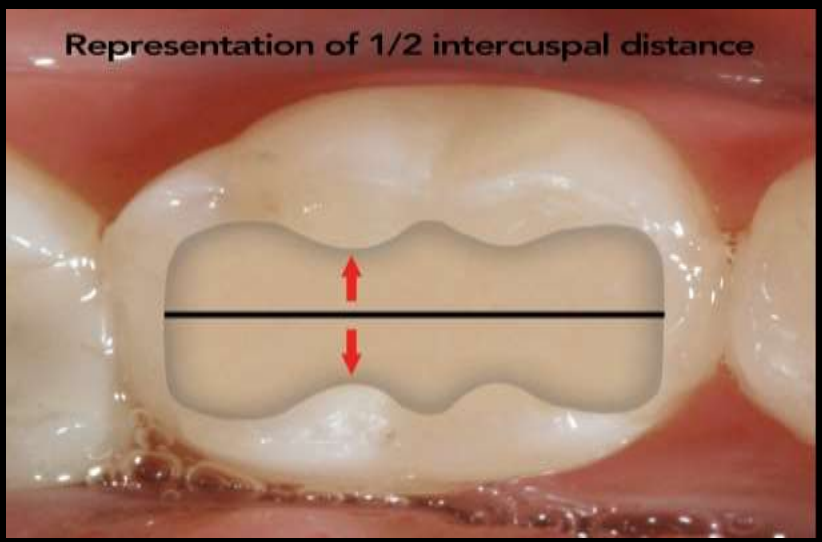
LARGE SIZED LESIONS (>2MM)

- 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

203



204

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***

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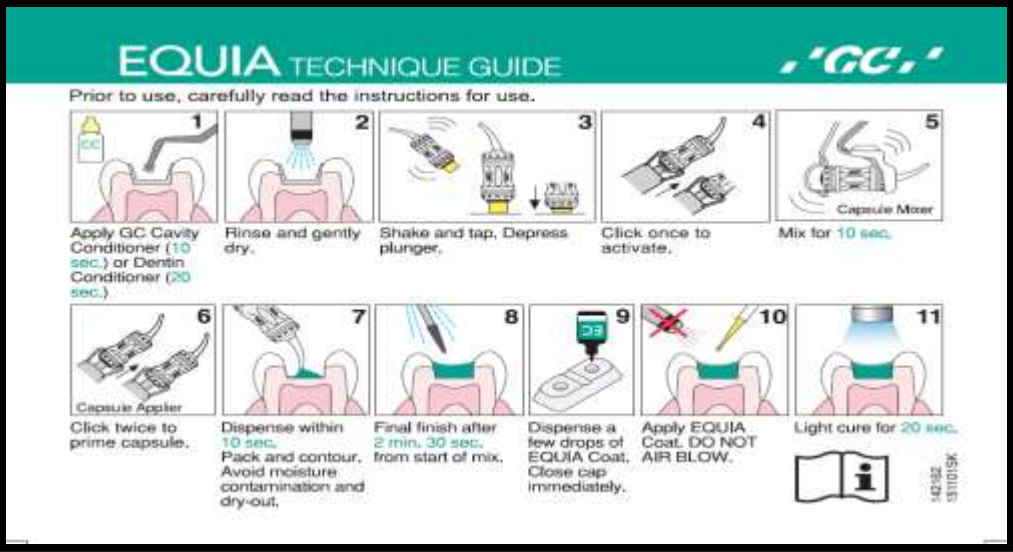
EQUIA FORTE HT

Caries control/quadrant dentistry

(Class II, III, V & core buildup)

206



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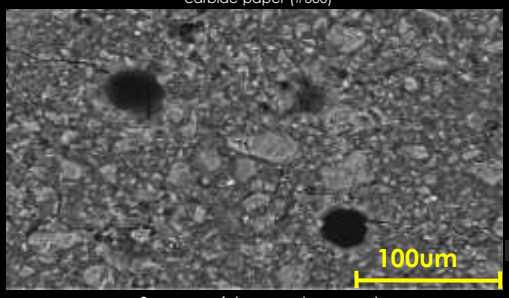
WHAT DOES EQUIA COAT DO?

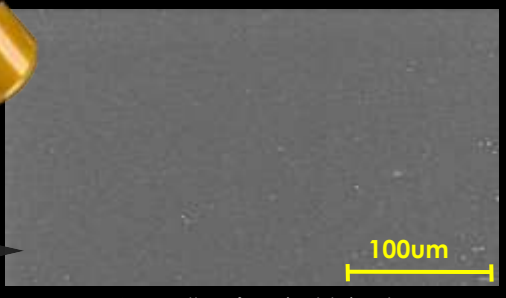
Fill porosities to increase physical properties of the restoration and offers a much smoother surface…

EQUIA FORTE HT
Polished by using silicon carbide paper (#600)



Some voids are observed

EQUIA FORTE HT
After coating



A smooth surface is obtained

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GLASS IONOMER VS. OPEN SANDWICH

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GLASS IONOMER VS. OPEN SANDWICH

- 10 years later.

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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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VISALYS (KETTENBACH)

- Temporary crown and bridge material based on a multifunctional acrylic composite. Suitable for the fabrication of temporary crowns, partial crowns, bridges, inlays, onlays and veneers. Made without BPA, High Strength, and Natural Luster
- Visalys Temp is available in six shades, A1, A2, A3, A3.5, B1 and BL
- Visalys Temp has a working time of 40 seconds, can be removed from the mouth between 1:20-2:20 minutes, and has a final set time of 4 minutes from
- Excellent esthetics, low air inhibition layer, very strong, and easy to trim.

219

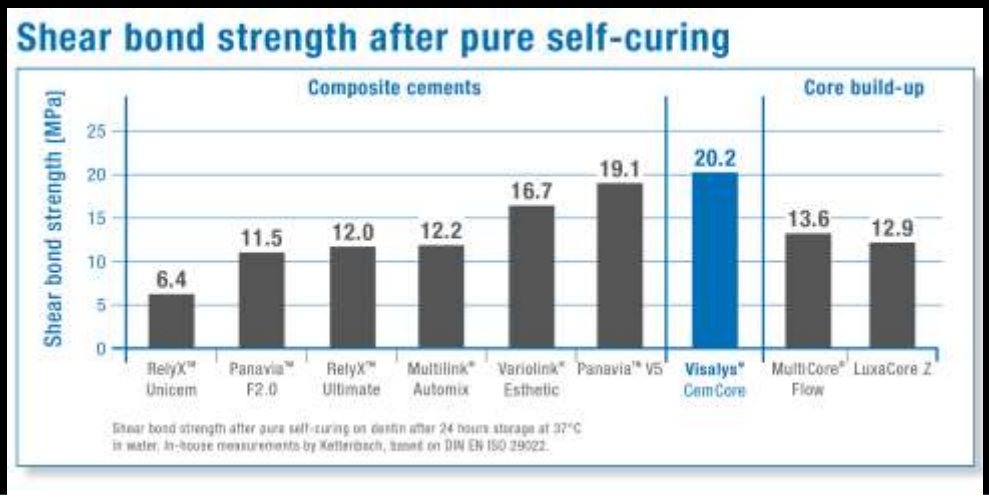
KETTENBACH VISALYS CEMCORE (Dual Cure)

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

220

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.



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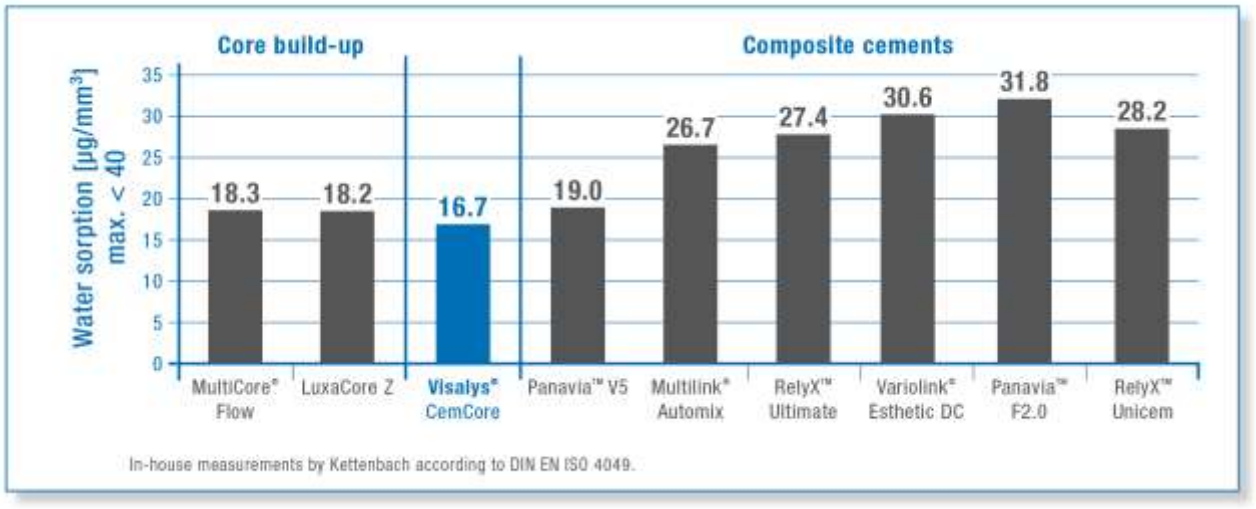

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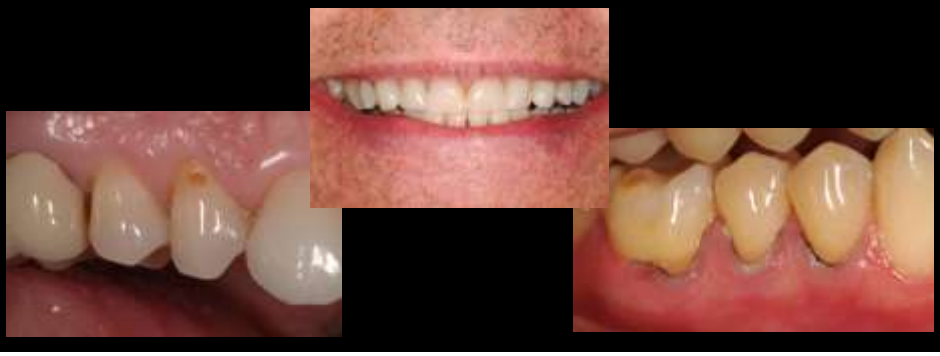
ABFRACTION LESIONS

- 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.



223

Flowables?

224

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.

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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.

226

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

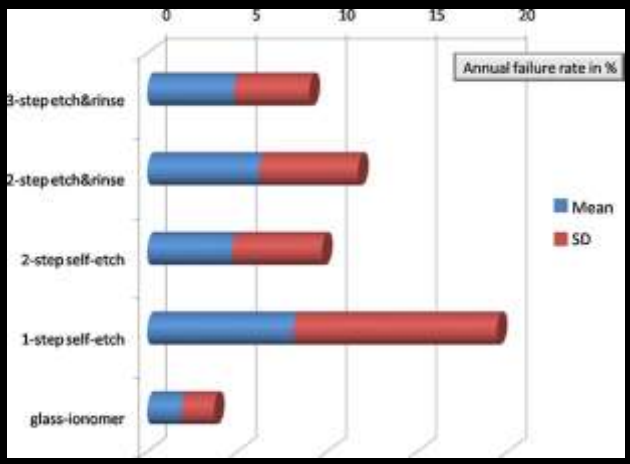

Fig. 15 – Graph representing the mean annual failure rates per adhesive class, determined according to a systematic review of Class-V clinical trials of adhesives during the period 1998–2004 [2].

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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

228

GC FUJI AUTOMIX LC

229

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.

231

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.

232

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.

233

Restorative Therapy- Case

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

234

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.

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RESIN MODIFIED GLASS IONOMER

236

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

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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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https://www.oralhealthgroup.com/features/bioactivity-restorative-dentistry-users-guide/

240

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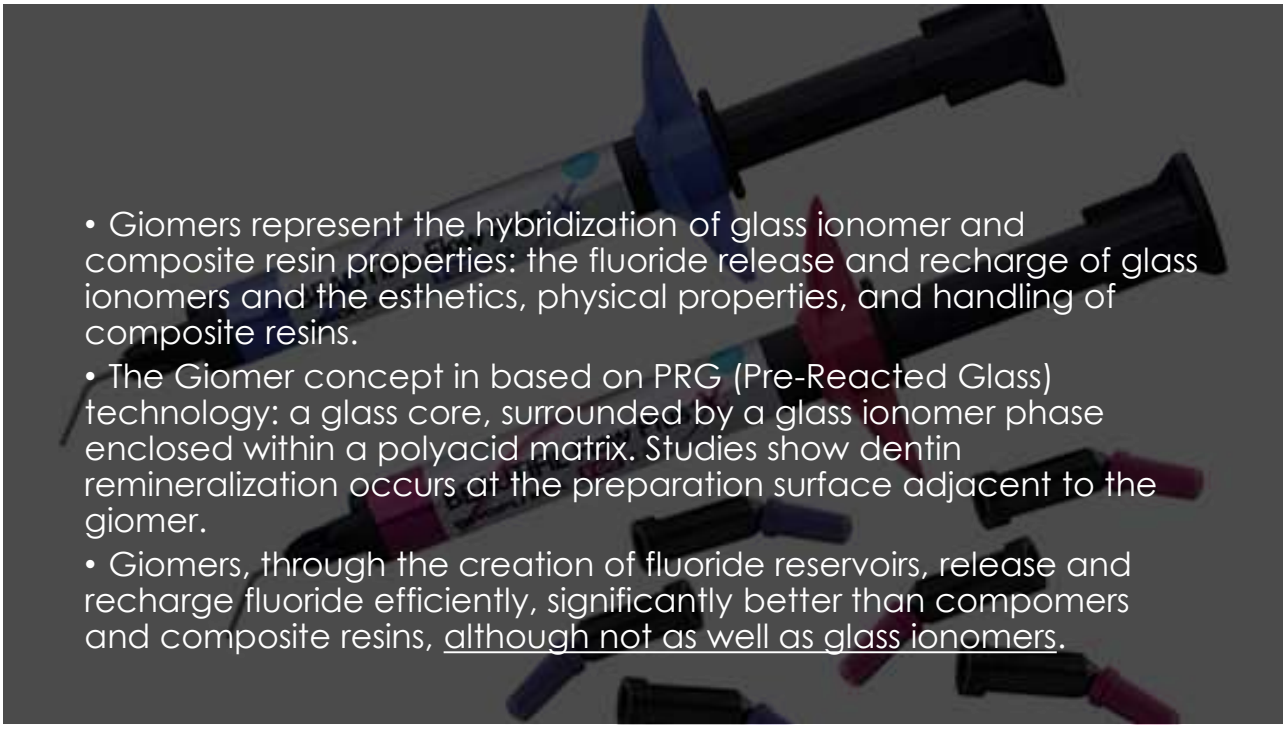
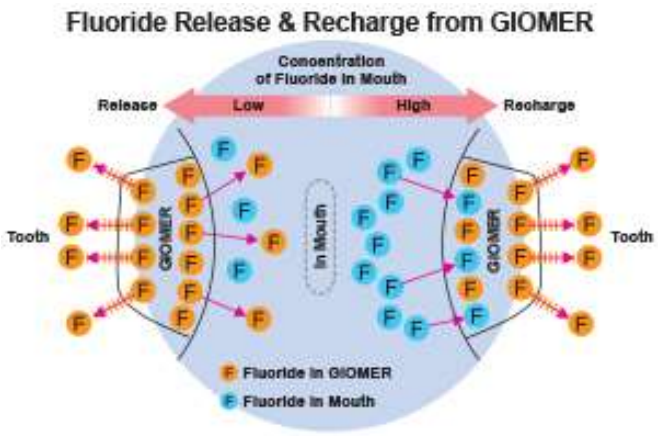


- Giomers represent the hybridization of glass ionomer and composite resin properties: the fluoride release and recharge of glass ionomers and the esthetics, physical properties, and handling of composite resins.
- The Giomer concept in based on PRG (Pre-Reacted Glass) technology: a glass core, surrounded 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.

242



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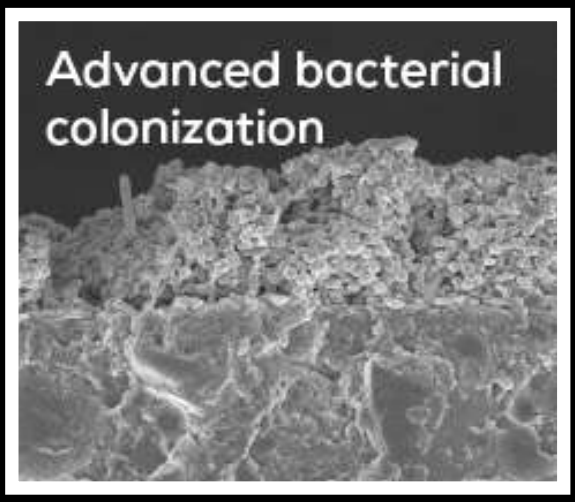
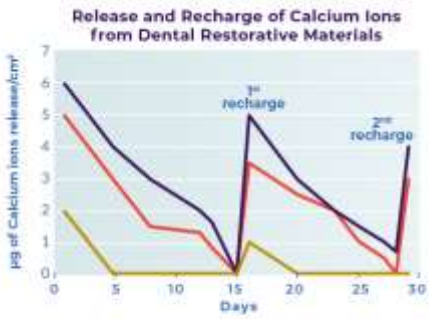
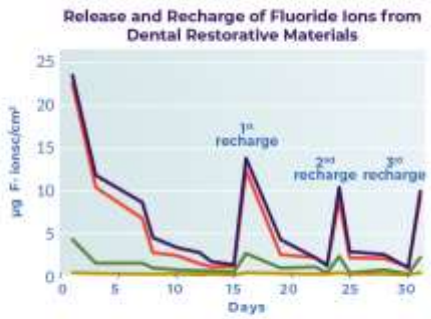


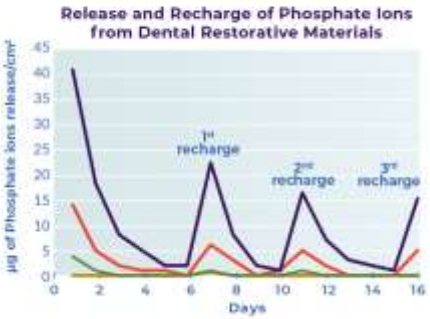
Conventional Composite

Bioactive Giomer Composite

244







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PULPDENT
ACTIVA BIOACTIVE-RESTORATIVE™

Releases/recharges calcium, phosphate and fluoride

246

DO Restoration Tooth #29

247

CLASS V AND CLASS II TOOTH #31

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Biofilm Challenge and Gap Formation

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

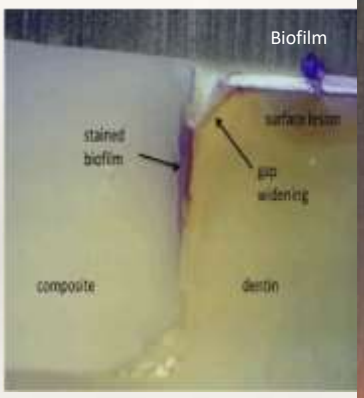
Biofilm is refreshed daily

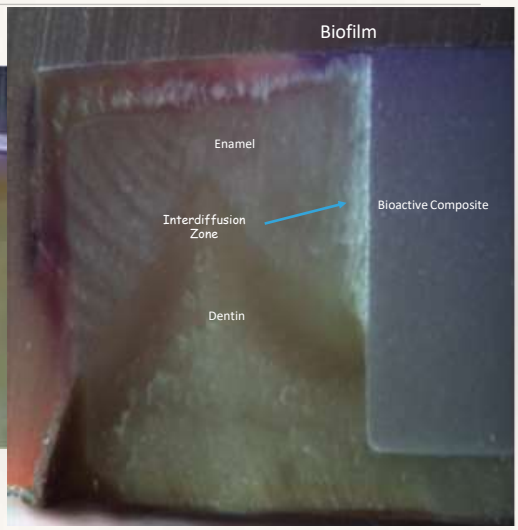
Results, biofilm can deteriorate margins and composites

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

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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

CRYSTA™ MCP TECHNOLOGY
U.S. PATENT NO. 11,116,701 B2

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ACTIVA BioACTIVE-BASE/LINER
ACTIVA BioACTIVE-CEMENT
ACTIVA Kids BioACTIVE-RESTORATIVE
ACTIVA BioACTIVE
PULPDENT
ACTIVA Presto
ACTIVA PRONTO
CRYSTA
DENTAL ADVISOR 2019 TOP AWARD WINNER
DENTAL ADVISOR TOP AWARD
BIOACTIVE RESTORATIVE
THE DENTAL ADVISOR
Activa BioActive-Restorative
TWO-YEAR CLINICAL PERFORMANCE
+ + + + +
98% rating at recall
www.dentaladvisor.com
RATING SYSTEM: Excellent + + + + + Very Good + + + + Good + + +

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FIND THE LESION?

252

DO YOU SEE THE PROBLEM?

253

HOW MANY OF THESE DO WE MISS AS DENTISTS?

254

MORE CONSERVATIVE RESTORATIONS

255

256

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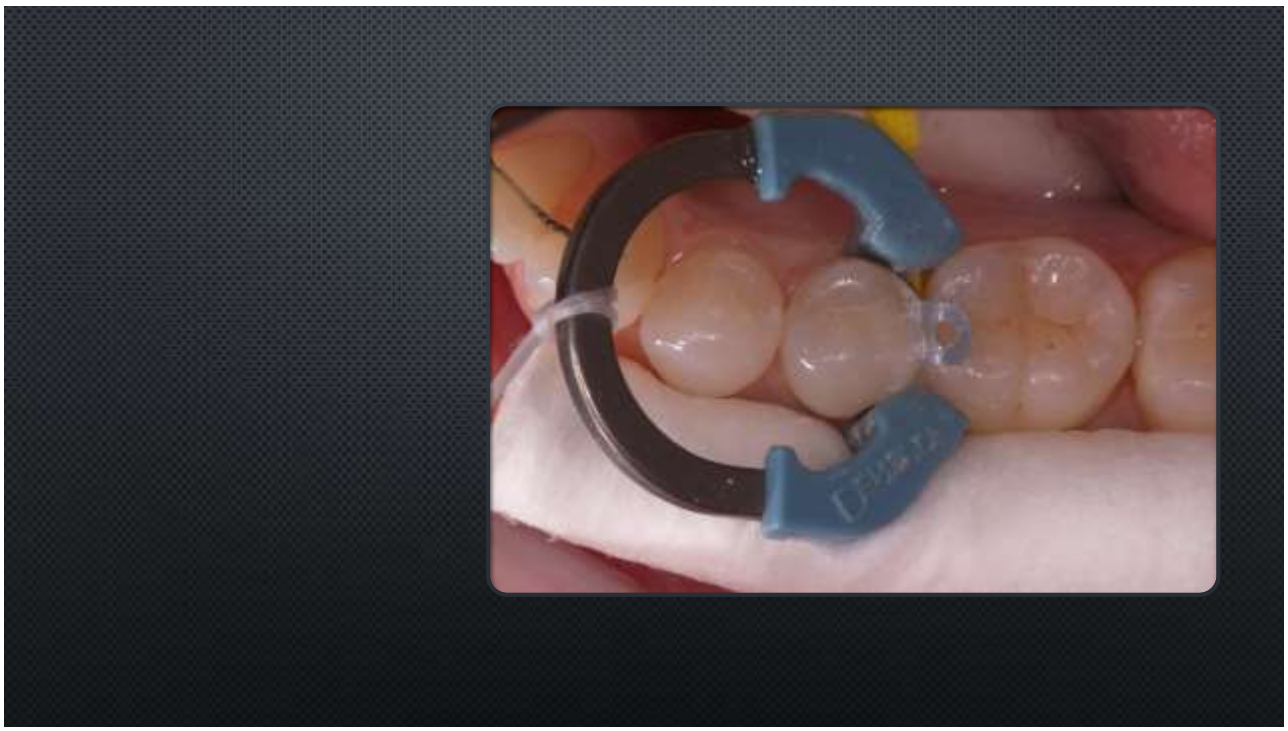

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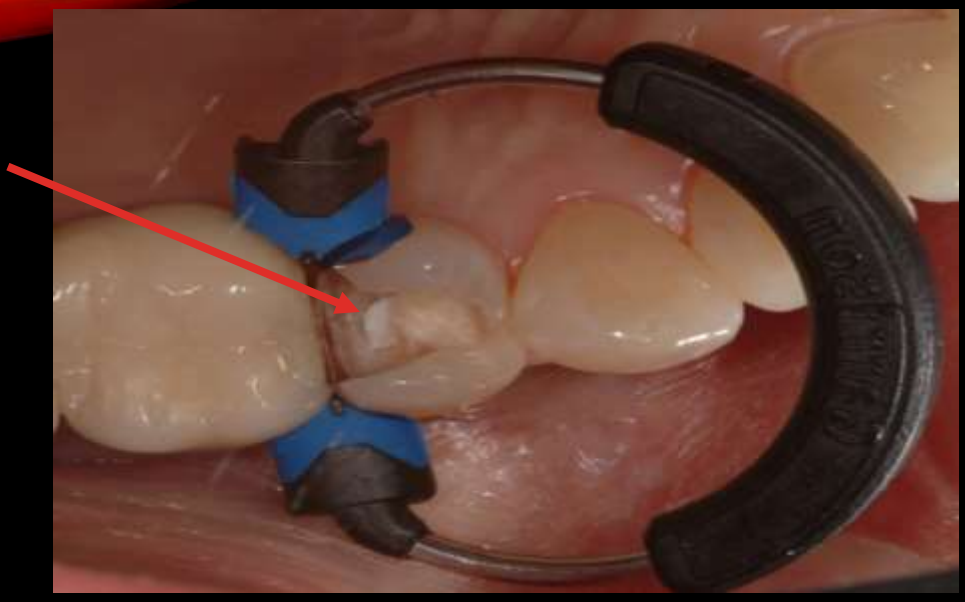
THERACAL LC (BISCO)

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.

265



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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**

268

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**

269

Cementation Technique

Calcium Aluminate/Glass Ionomer Hybrid Cement**

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

270

Ceramir Protect LC Liner & Implant Cement

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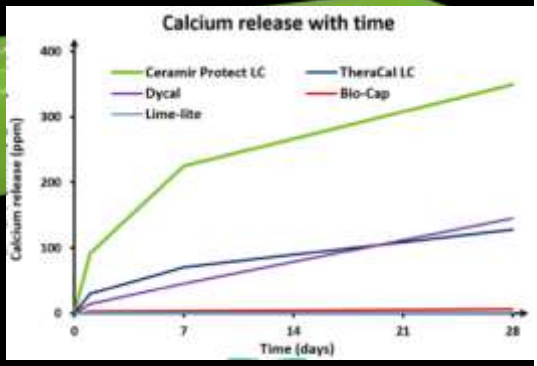
CERAMIR PROTECT LC (DOXA)

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



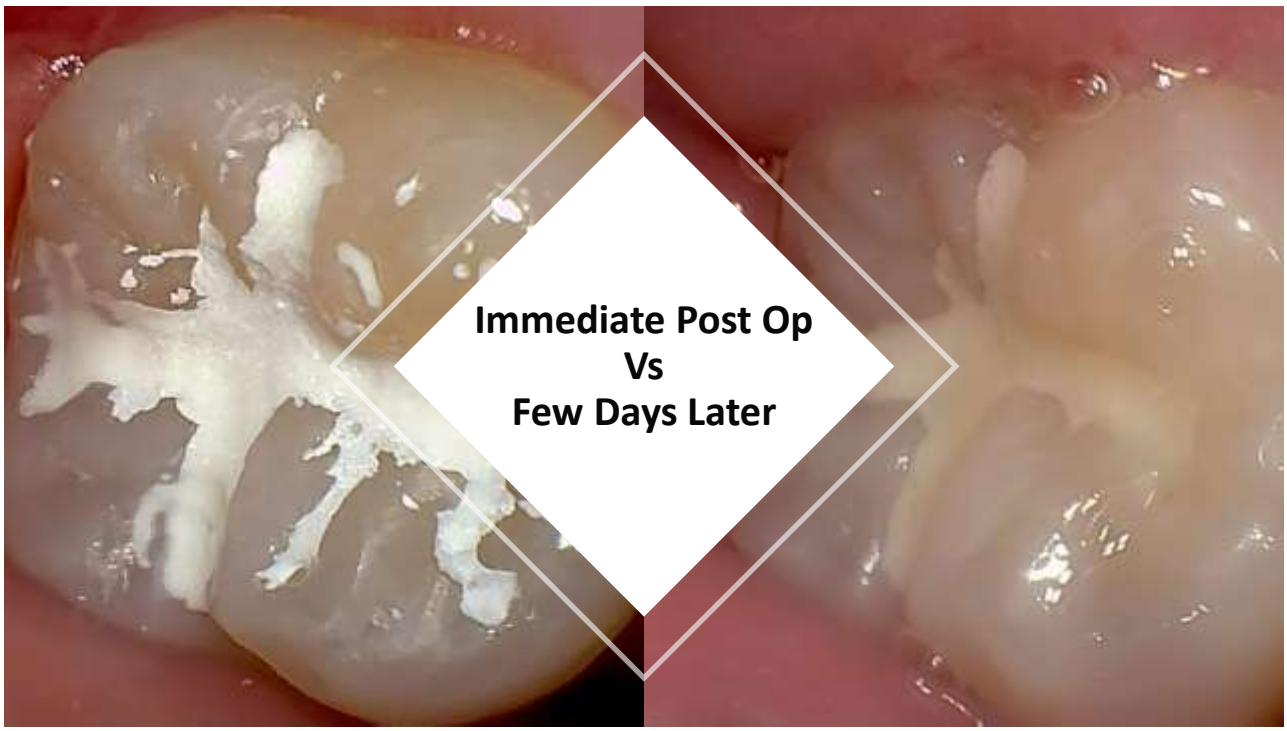
Indirect pulp capping in deep preparations:
- Under amalgam restorations
•Under Class I and Class II composite restorations
•Under cements
•As an alternative to calcium hydroxide

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

272

Bioactive
Biocompatible
Restorative
Material
ceramir
RESTORE
QUIXCAP
capsule
innovation

273


Immediate Post Op
Vs
Few Days Later

274

275

CLASS V - RESTORATIONS

276

Class V Restorations
-subgingival
-deep restoration
-moisture control

Doxa

277

CLASS V - RESTORATIONS

Doxa

278

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

Doxa

279

Class I, II & III Non-Load Bearing Restorations

Doxa

280

Wedge Guards (TrioDent /Ultradent)

Doxa

281

FenderWedges (Garrison Dental)

Doxa

282

Fendermate (Directa Dental)

Doxa

283

Class I, II & III Non-Load Bearing Restorations

Doxa

284

Class I, II & III Non-Load Bearing Restorations

Doxa

285

Class I, II & III Non-Load Bearing Restorations

Doxa

286

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

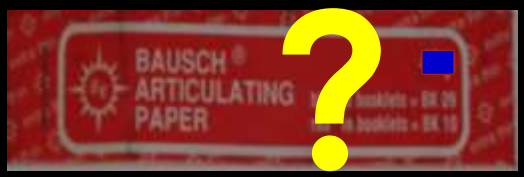
287

CENTRIC OCCLUSION DENTISTRY (OR MIP) FOR INDIRECT RESTORATIONS

288

Human Hair 60 –120um
6,000 – 12,000nm

Red Blood Cells 2 – 5um
200-500nm



289

SHIMSTOCK & ARTICULATING PAPER

What do you use…..

….and why?

290

SHIMSTOCK & ARTICULATING PAPER

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

291

What do you use…..

….and why?

8µm articulating paper
Available in blue

Mark the bite before prepping teeth!!

292

TROLLDENTAL-
4.5MM ARTICULATING PAPER
WWW.TROLLDENTALUSA.COM
TrollDental
DIRECTA DENTAL

293

Dr. Todd Snyder
Webinar Attendees Receive:
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Promo code: 22SNY
Expiration date: 12/31/2022
BISCO
* U.S. customers only. Cannot be combined with any other offer. One purchase only. Rx only.

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SCAN ME

ENTER FOR A CHANCE TO WIN a *free* All-Bond Universal®*

BISCO

304

- https://info.bisco.com/dr-snyder-course-raffle-northern-california-dental-society

305

306

Lecture Handout

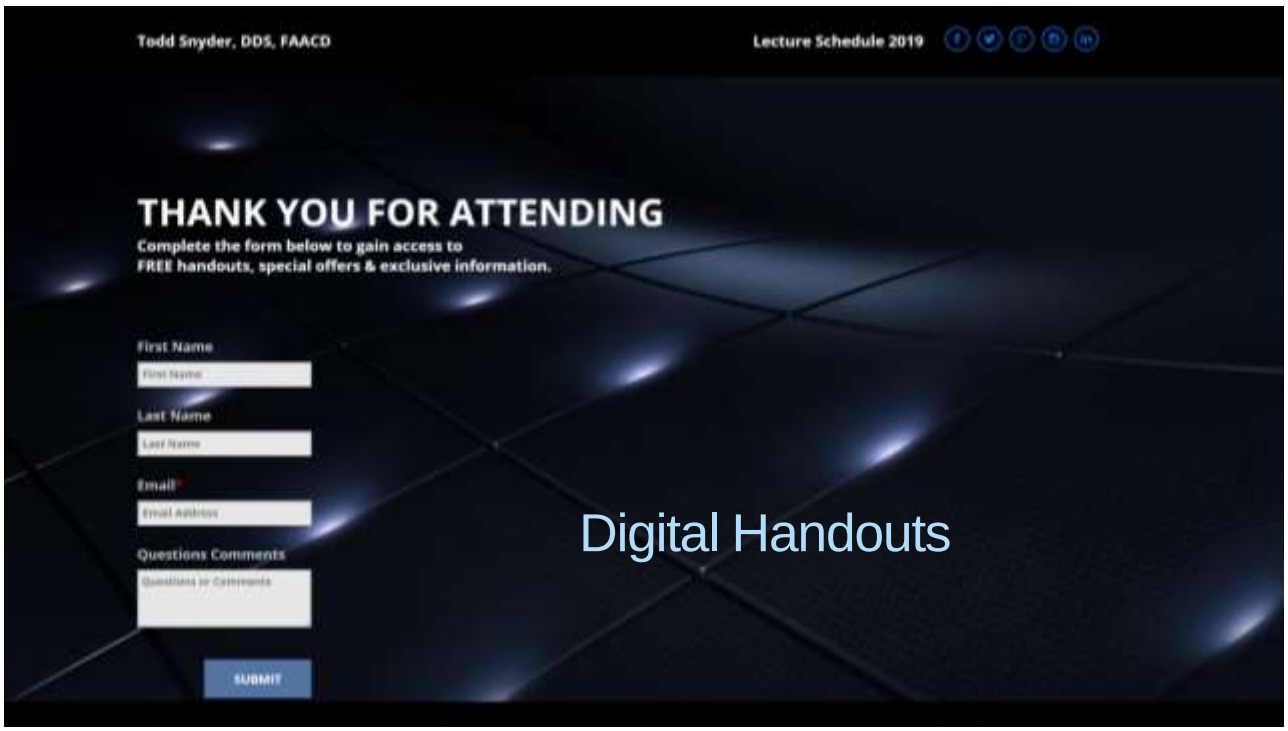
www.DENTOOLZ.com

Digital Handouts, Products I Use & Special Offers

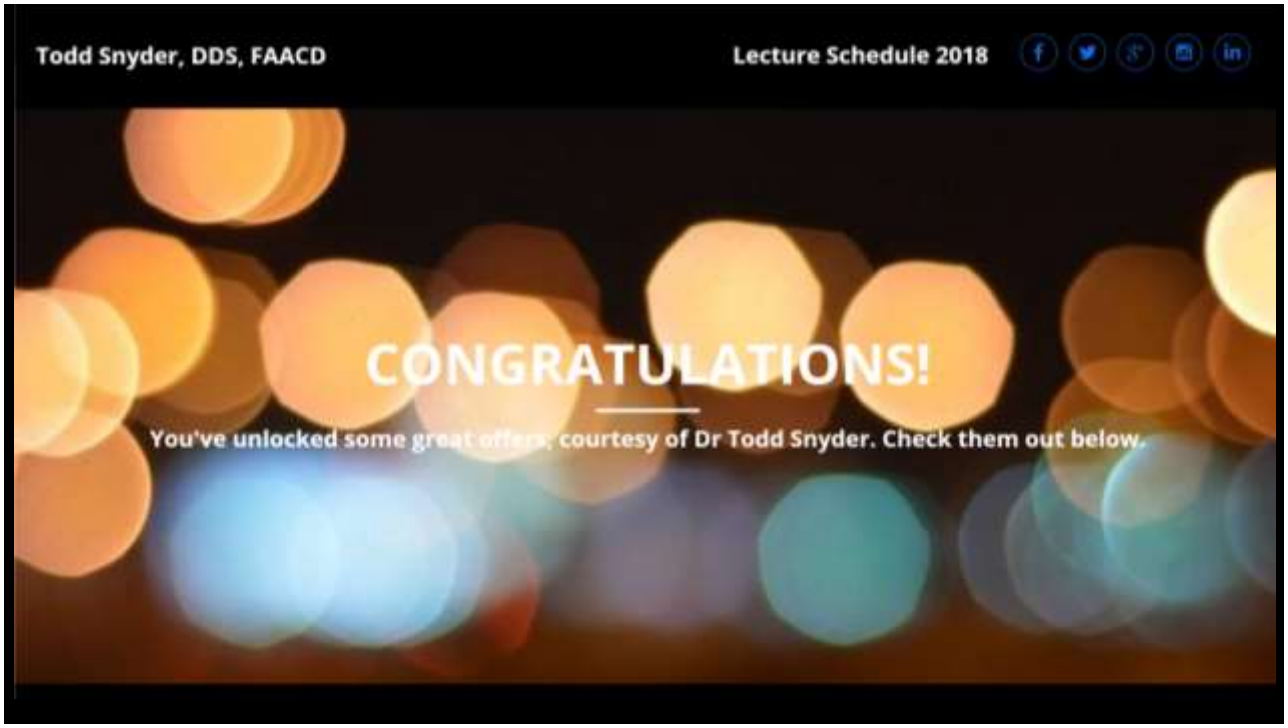
308

Lecture Handout with additional free content
www.DENTOOLZ.com
Digital Handouts, Products I Use & Special Offers
Link will be emailed to you, check your spam/junk folder.

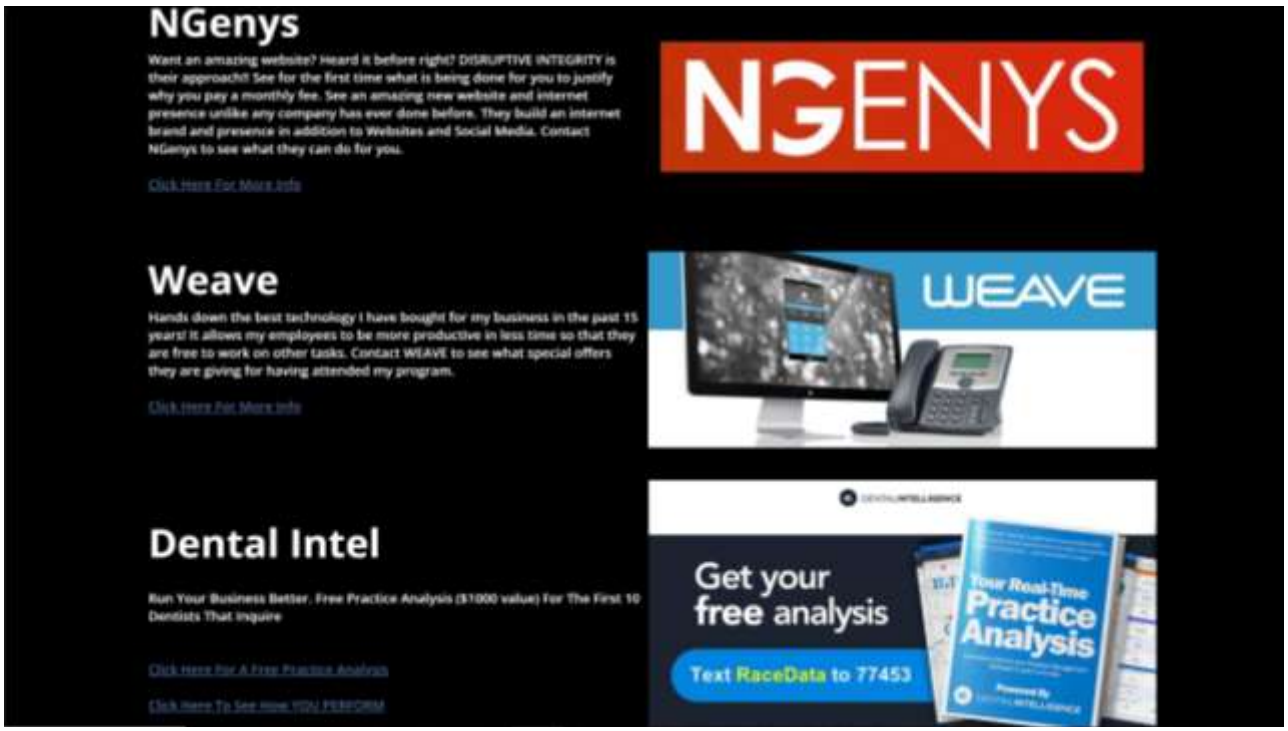
309


Todd Snyder, DDS, FAACD
Lecture Schedule 2019
THANK YOU FOR ATTENDING
Complete the form below to gain access to
FREE handouts, special offers & exclusive information.
First Name
Last Name
Email
Questions Comments
SUBMIT
Digital Handouts

310


Todd Snyder, DDS, FAACD
Lecture Schedule 2018
CONGRATULATIONS!
You've unlocked some great offers, courtesy of Dr Todd Snyder. Check them out below.

311


NGenys
Want an amazing website? Heard it before right? DISRUPTIVE INTEGRITY is their approach! See for the first time what is being done for you to justify why you pay a monthly fee. See an amazing new website and internet presence unlike any company has ever done before. They build an internet brand and presence in addition to Websites and Social Media. Contact NGenys to see what they can do for you.
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NGENYS
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Hands down the best technology I have bought for my business in the past 15 years! It allows my employees to be more productive in less time so that they are free to work on other tasks. Contact WEAVE to see what special offers they are giving for having attended my program.
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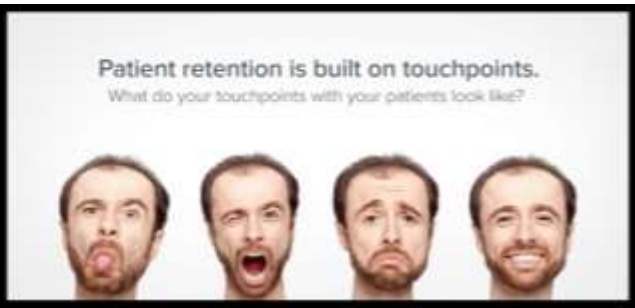
WEAVE
Dental Intel
Run Your Business Better. Free Practice Analysis ($1000 value) For The First 10 Dentists That Inquire
Click Here For A Free Practice Analysis
Click Here To See How YOU PERFORM
Get your free analysis
Text RaceData to 77453
Your Real-Time Practice Analysis

312

34 Ways To Increase Patient Retention

Click Here To Learn How



More Elective Cosmetic Dentistry

Click Here For Handout

Porcelain Veneers, Smile Makeovers: The Business of More Elective Cosmetic Dentistry | TODD C. SNYDER, DDS, FAACD

313

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LEGION

TSNYDER@LEGIONPRIDE.COM

WWW.LEGION.DENTIST

TODD C. SNYDER, DDS, FAACD

314

Beautiful Smiles...

..with Composite Bonding

Todd Snyder, DDS, FAACD, FIADFE

317

318

319

320

Mockup shade and then remove composite interproximally.
Restore one tooth to completion then the second tooth.
No matrix is necessary as tooth shape is present.

321

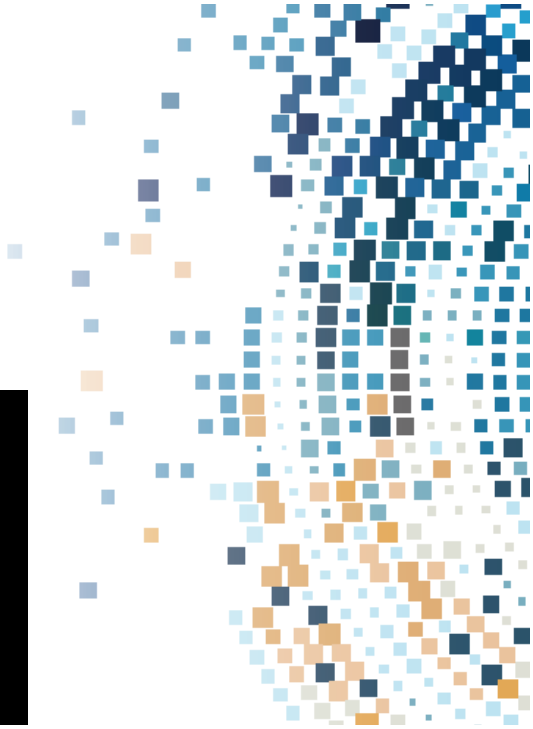
One Shade of Mosaic

322

EFFICIENCY. DURABILITY. ARTISTRY.

mosaic™

Universal Composite



- nanohybrid
- Superior handling
- High polishability & gloss retention
- Exceptional wear
- Unique syringe design
- Intuitive shade offering

323

324

325

326

Small Cases have increased Difficulty due to

- Color matching - take photos, and practice composite selection on tooth
- Translucency - take photos, extend composites off incisal edge
- Masking margins - preparation must have a bevel on one or both sides
- Texture
  - smooth surface is easy but takes longer to polish to eliminate imperfections
  - anatomy and texture hides colors better and takes less time.
- Polish - use multiple viscosities and/or polishers

327

328

One Shade of Mosaic

329

Use gauges to measure teeth to create best outcomes.

330

Measure both teeth and add to just the smaller tooth when ever possible. Pack a small #00 retraction cord to push tissue back.

332

One Shade of Mosaic

334

335

336

One shade this week

337

Second Case This Week

Three Shades of Mosaic A3, EN, EY

338

First Key to Accuracy, Consistency & Speed

Photos, Color & Trans, Mockup, Template

Three Shades of Mosaic A3, EN, EY

339

Second Key to Accuracy, Consistency & Speed

Shape, Texture & Polish

Three Shades of Mosaic A3, EN, EY

340

GETTING TO THE FINISH LINE... ACCURACY, CONSISTENCY & SPEED

1. Photography
2. Magnification
3. Test Composite Colors
4. Second Photo?
5. Create A Template
6. Preparation/Air Abrasion
7. Isolate, Etch, Bond, Cure
8. Wax Floss on Adjacent Tooth

1. Enamel Composite In Template, Don't Touch Adjacent, Cure
2. Dentin Shade w/ Lobes, Cure
3. Enamel Shade with Mylar Pull through for Shape. Tap to Gain Contact, Cure
4. Texture/Polish

341

Big Cases or Small Cases

342

Large Cases are time consuming, but Easier

- Changing the color of many teeth at once is easier as you remove many of the small colors.
- Takes longer to do more teeth however.
- Use retraction cord at gingival to push tissues back so margins can be at or slightly under gum line.

343

344

Silginat - Kettenbach
Counter FIT- Multipurpose Replication Silicone
(Clinician's Choice)

345

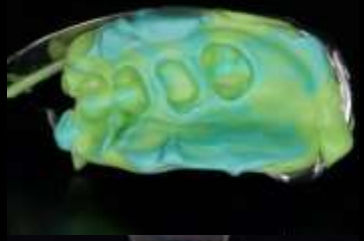
Silginat - Kettenbach
Counter FIT- Multipurpose Replication Silicone
(Clinician's Choice)

346

TIP

Kettenbach

Panasil Initial Contact (VPS)



347

Panasil (VPS)

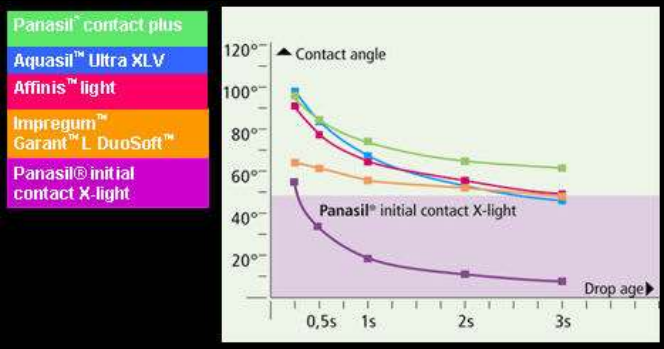
Viscosities
Set Times
Wetability
Detail

348

Kettenbach

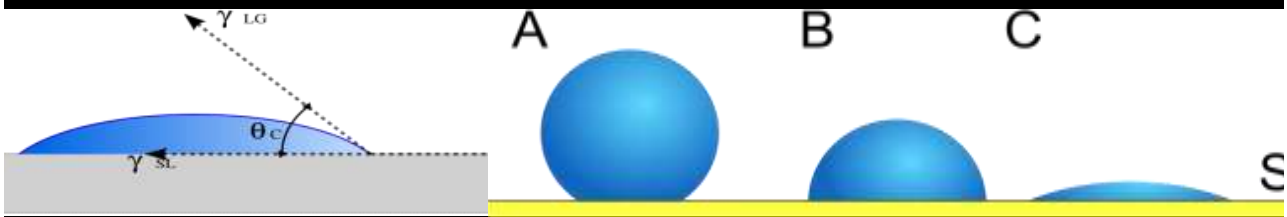
Panasil Initial Contact

- Lowest contact angle of any VPS impression material
- Fast set and Regular set



349

Hydrophilicity: angle of contact



350

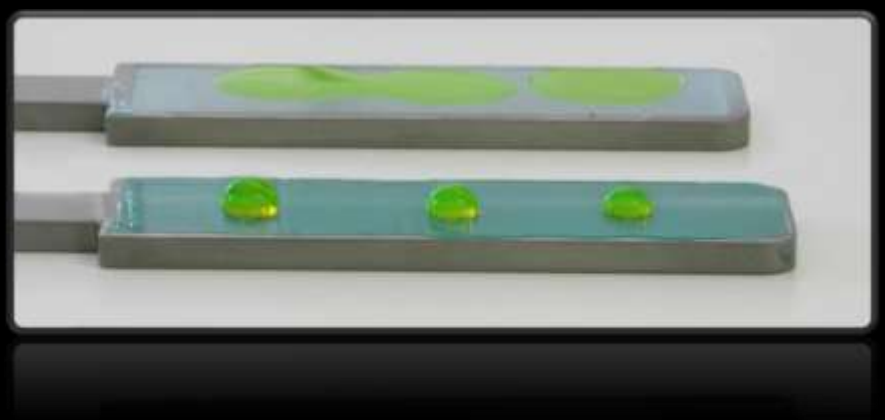
Panasil ® = Hydrophilicity

- Hydrophobic water droplet
- Hydrophilic water droplet

Lowest contact angle of any VPS impression material

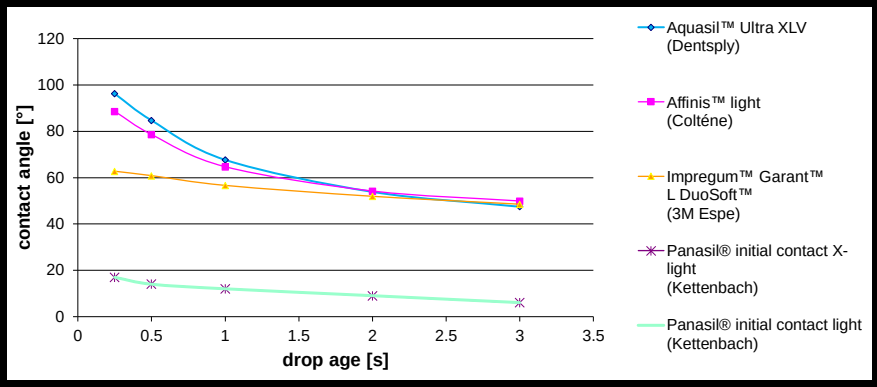
351

Panasil® Initial Contact (PIC) Hydrophilicity Demo



352

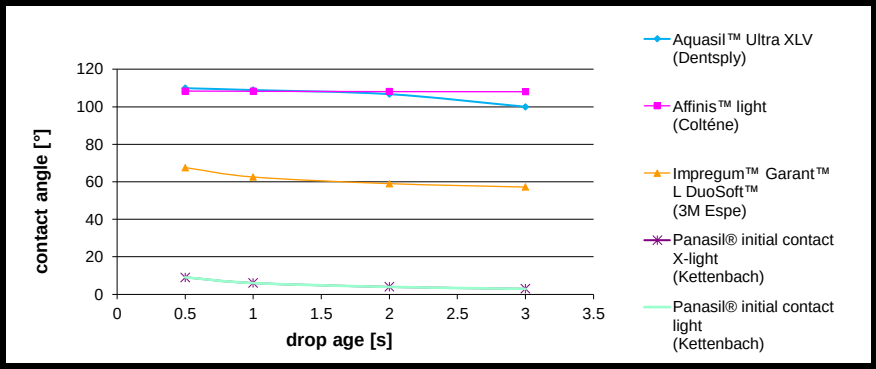
Hydrophilicity: comparison



Comparison of spreading behavior 30 s after mixing starts within the first 3s after applying a water drop: relative humidity 50 % - 80 %

353

Hydrophilicity: comparison



Contact angle after 30 min at 23°C: relative humidity 50 %

354

Kettenbach

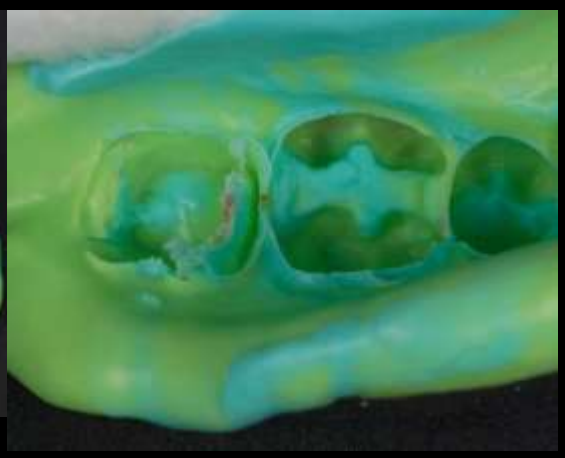
Cracked tooth

355

356

Kettenbach

Panasil Initial Contact

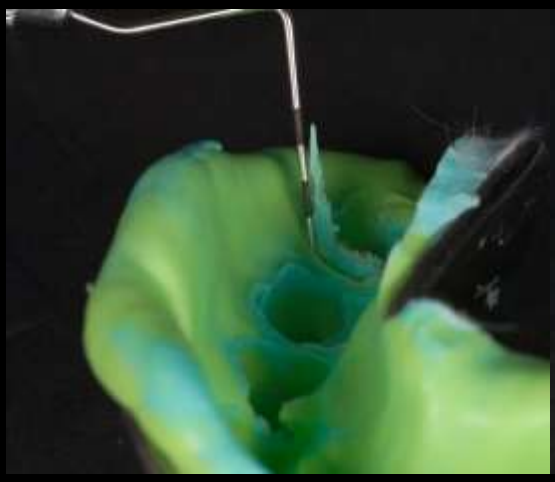


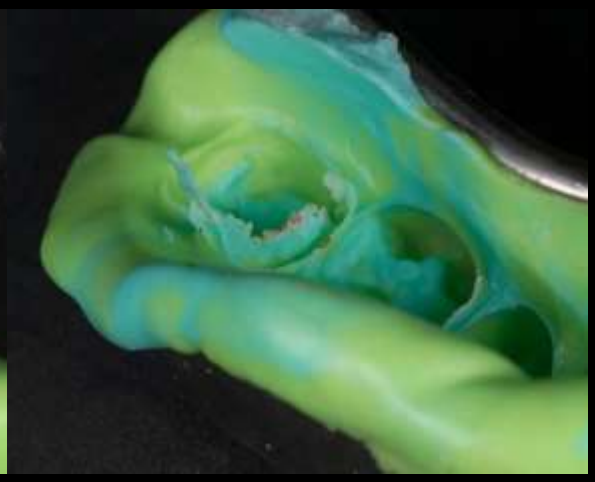
- Exceptional Flow Properties
- Exceptional Detail
- Exceptional Performance even in a moist environment

357

Kettenbach

Panasil Initial Contact





358

Futar® D Fast
Bite registration
KETTENBACH
Futar® Scan
NORMAL
7X The Choice. Futar®
A complete line of high-quality Futar® bite registration materials saves practitioner time and money; without sacrificing quality.

359

360

361

#000 Retraction Cord (no hemostatic)

362

Air abrasion used on tooth for better adhesion

363

364

45% filled

365

Veneer Finishing System

FREE SAMPLES AT BOOTH TODAY

366

ContacEZ Restorative strip system

- Black Diamond Strip 0.06mm fine diamond single sided
- Orange Serrated Diamond Strip 0.05mm extra fine diamond single sided
- White Serrated Strip 0.035mm
- Blue Serrated Strip 0.065mm
- Gray Final Polishing Strip 0.05mm ultra fine diamond single sided

367

Polish & Texture

368

Use fine diamonds or discs, carbides tend to ditch.

369

Use fine diamonds or carborundum stones for anatomy.

370

372

Use a System that goes from Coarse to Final Shine but be careful tonot remove anatomy

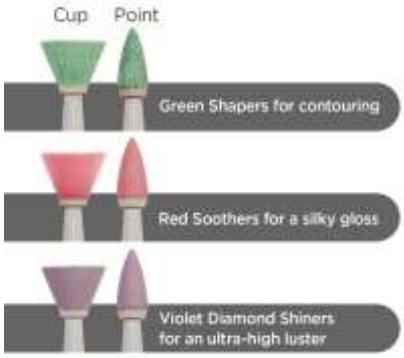
Jiffy Polishing System (Ultradent)

373

374

Jiffy Polishing System (Ultradent)

375



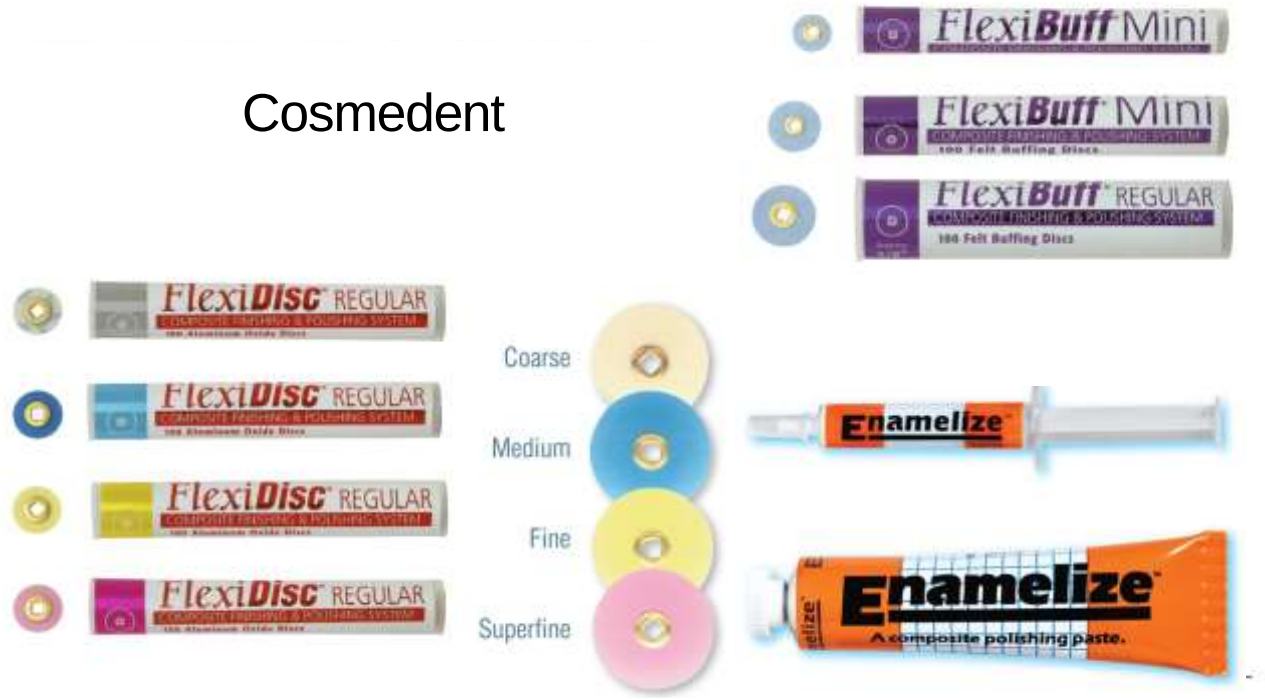
Absolute Polishers (Parkell)

376

Favorite Polishing Discs

377

Cosmedent



378

Interproximal polishing

- Trick is don't wrap, pull asymmetrically behind adjacent toth

379

Micerium & Cosmedent

- Utilizes Diamond polishing pastes
- Aluminum Oxide
- Goat hair brushes
- Felt wheels and buffs

380

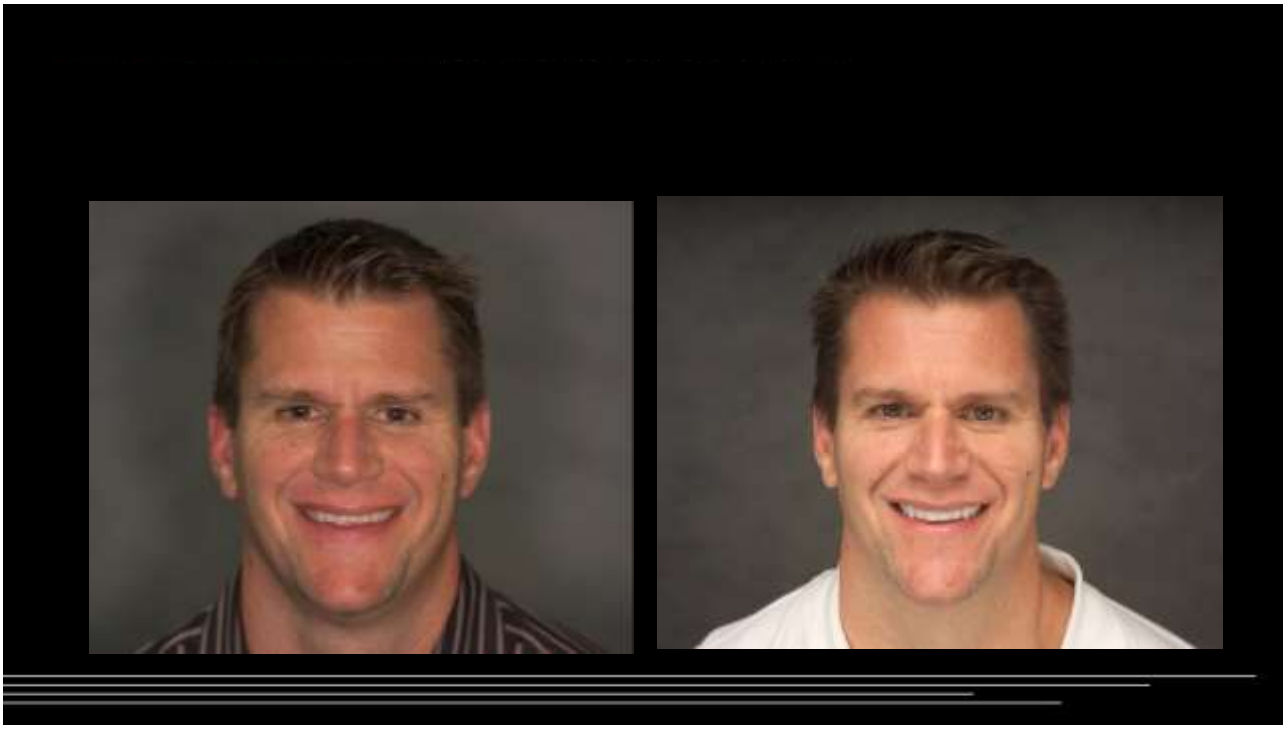
GETTING TO THE FINISH LINE... ACCURACY, CONSIS

381

382

Create anatomy and polish so as not to remove the anatomy for better light reflection.

383



384

385

396

Goat Hair Polisher & Polishing Paste

397

BRASSELER HIGH SHINE

10019HP

10019HP

16122HP

398

Mosaic

399

400

401

Mosaic Day One

402

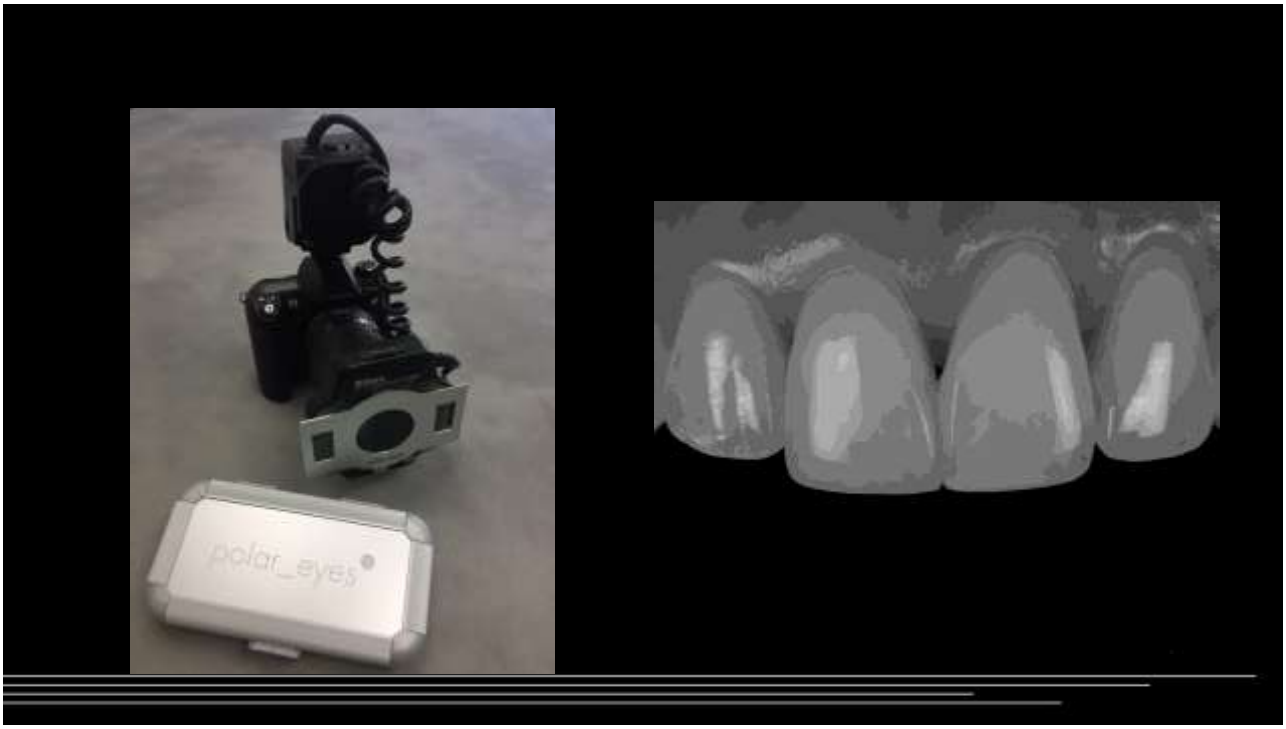
Mosaic Day One

403

404

Shofu EyeSpecial C-IV

407



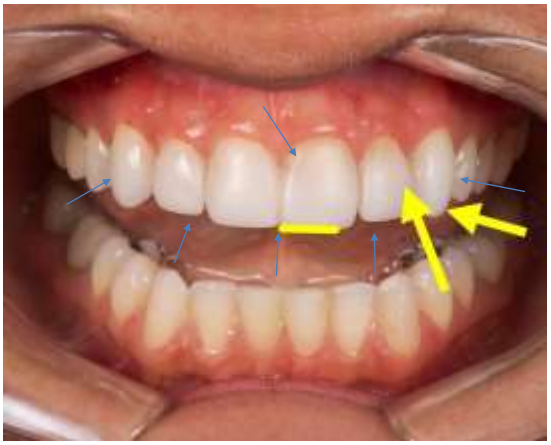
408

409

410

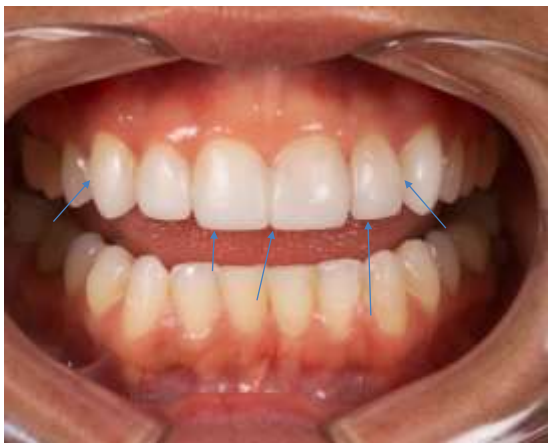
411

Mosaic Day One



412

Mosaic Day Two



413

Mosaic Day Two

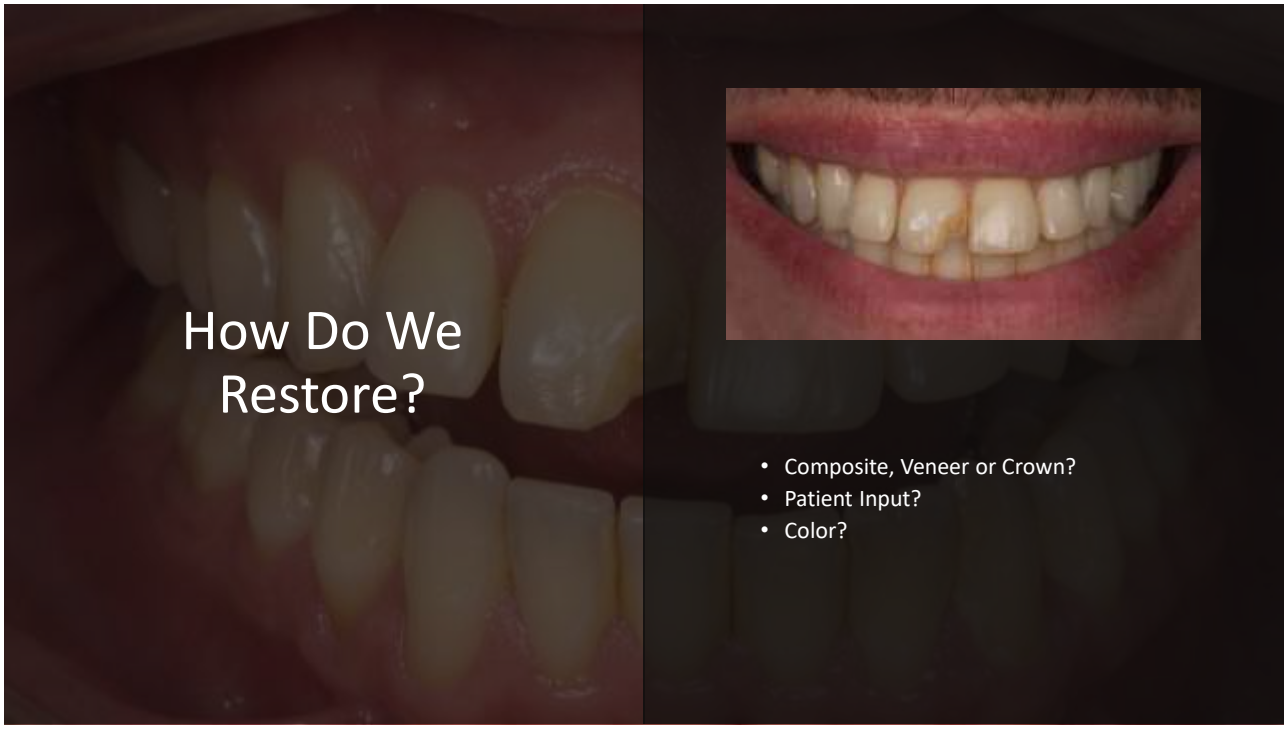
414

Mosaic Day Three

415

416

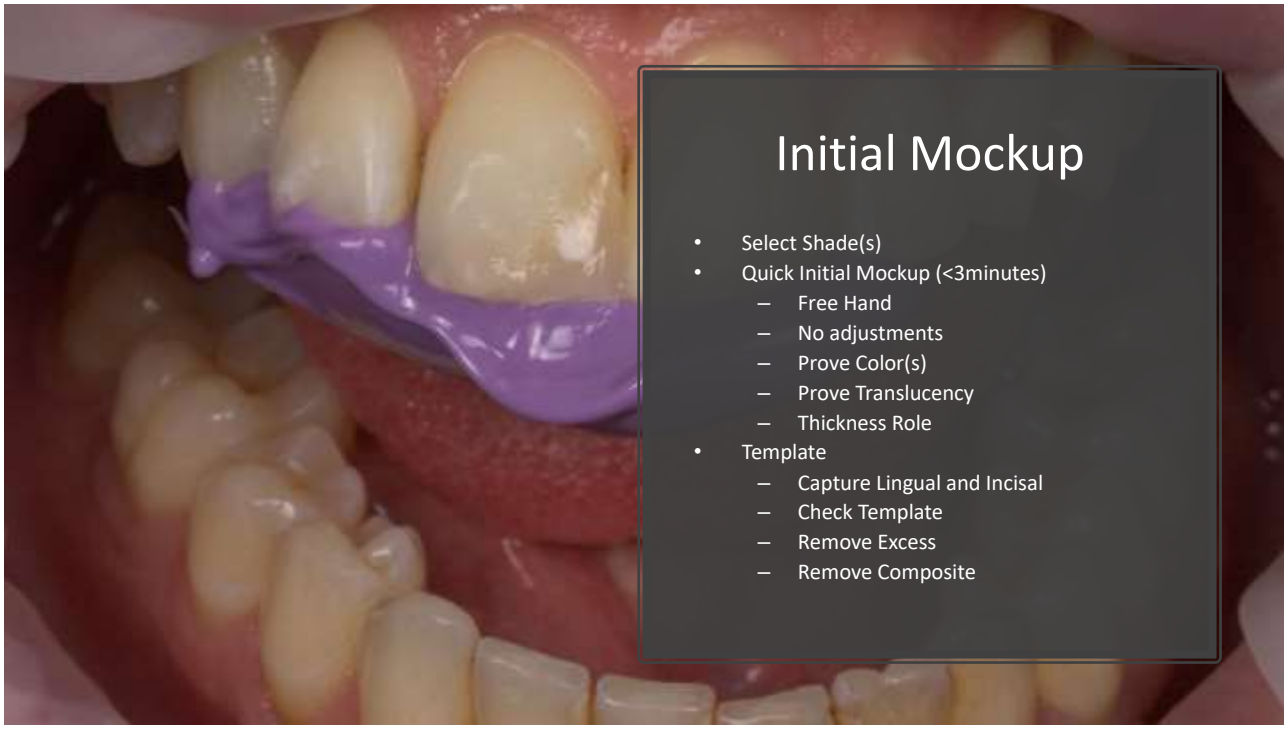
417


How Do We Restore?
• Composite, Veneer or Crown?
• Patient Input?
• Color?

418

How Do We Restore?
• Composite, Veneer or Crown?
• Patient Input?
• Color?

419


Initial Mockup
Select Shade(s)
Quick Initial Mockup (<3minutes)
Free Hand
No adjustments
Prove Color(s)
Prove Translucency
Thickness Role
Template
Capture Lingual and Incisal
Check Template
Remove Excess
Remove Composite

420

421

Air Abrasion, Total Etch, Mylar

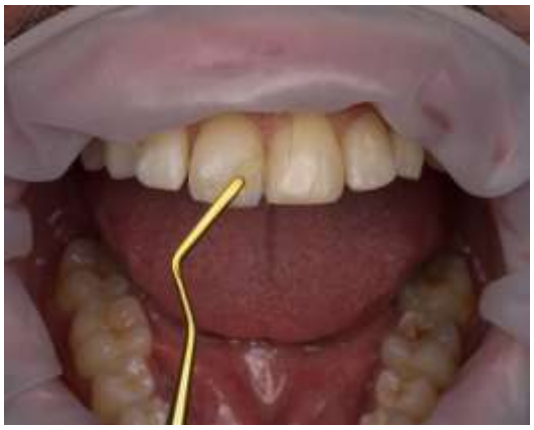
422

Adhesive, Template, Enamel Composite

423

Dentin Composite

424



Sculpt Dentin, Cure, Add Enamel

425

Discs to Contour

426

Discs to remove fine scratches

427

Polishers for surface and interproximal areas

428

Make the Task Easy

429

430

431

Class IV / Diastema Template Technique

Anterior Composite Bonding

432

Select all composite colors first before dehydration occurs

Place	Place small increment of composite on tooth or extending from tooth and cure for 5-10 seconds.
Evaluate	Evaluate color and add additional colors
Layer	Layer a translucent on top of dentin/body colors, or extend off of incisal edge

433

Create a Lingual Template whenever possible

434

Extend bevel either half or full width of defect

435

Labial and lingual bevel or chamfer

436

Labial and lingual bevel or chamfer

437

Labial and lingual bevel or chamfer

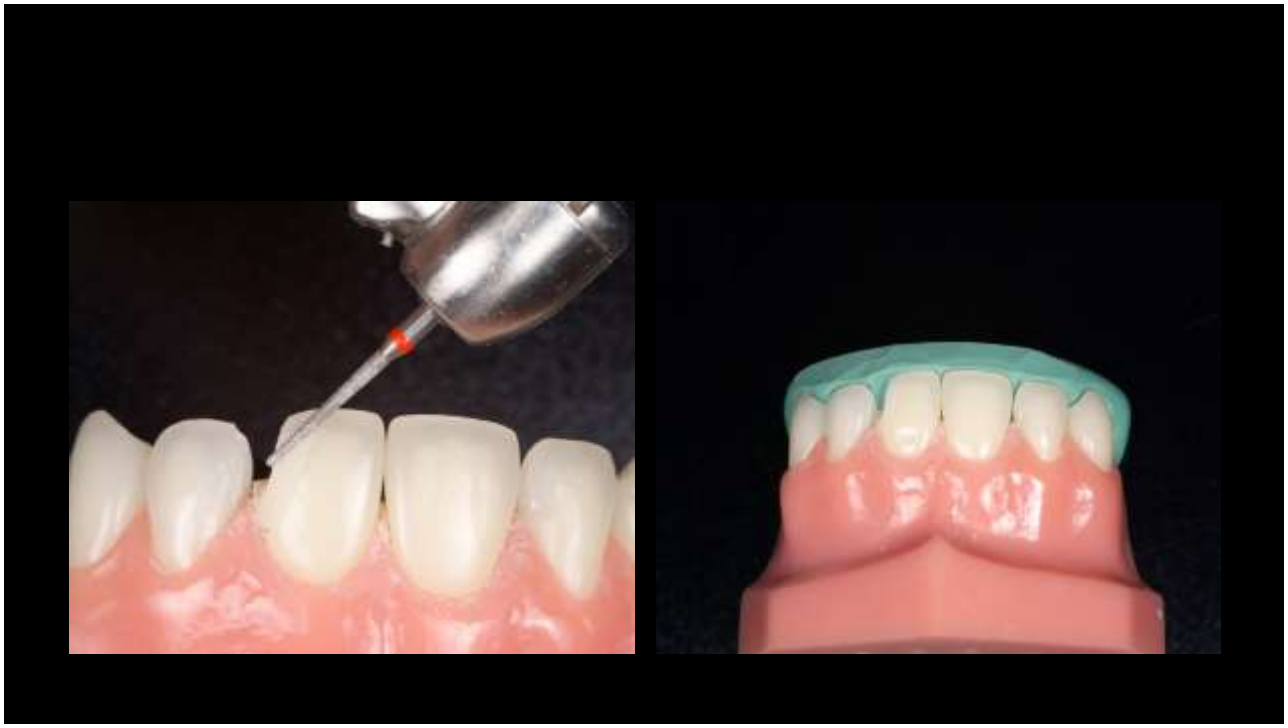
438

Don’t over bevel on incisal edge, it creates more translucency to oral pharynx

439

440

441



442

443

Use mylar when etching and bonding. Use wax floss on adjacent tooth if needed.

444

Enamel shade on matrix to build a shelf

445

Compress composite into position

446

Tease composite off adjacent tooth and adapt

447

Use mylar to create interproximal shape

448

Hold against tooth for contour and pull to lingual

449

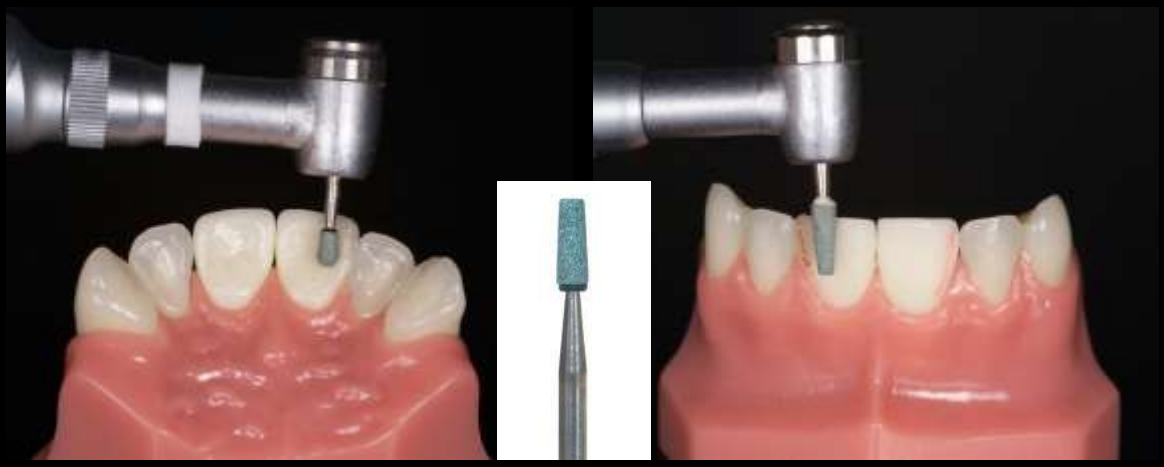
Light adaptation to push composite against adjacent tooth creates the contact. Use brush to thin facial finish line or metal instrument. Try to create all anatomy and shape to minimize contouring steps with handpiece

450

Begin to define line angles

451

Carborundum stone (Shofu) Dura-Green Stones for minimal reduction and texture



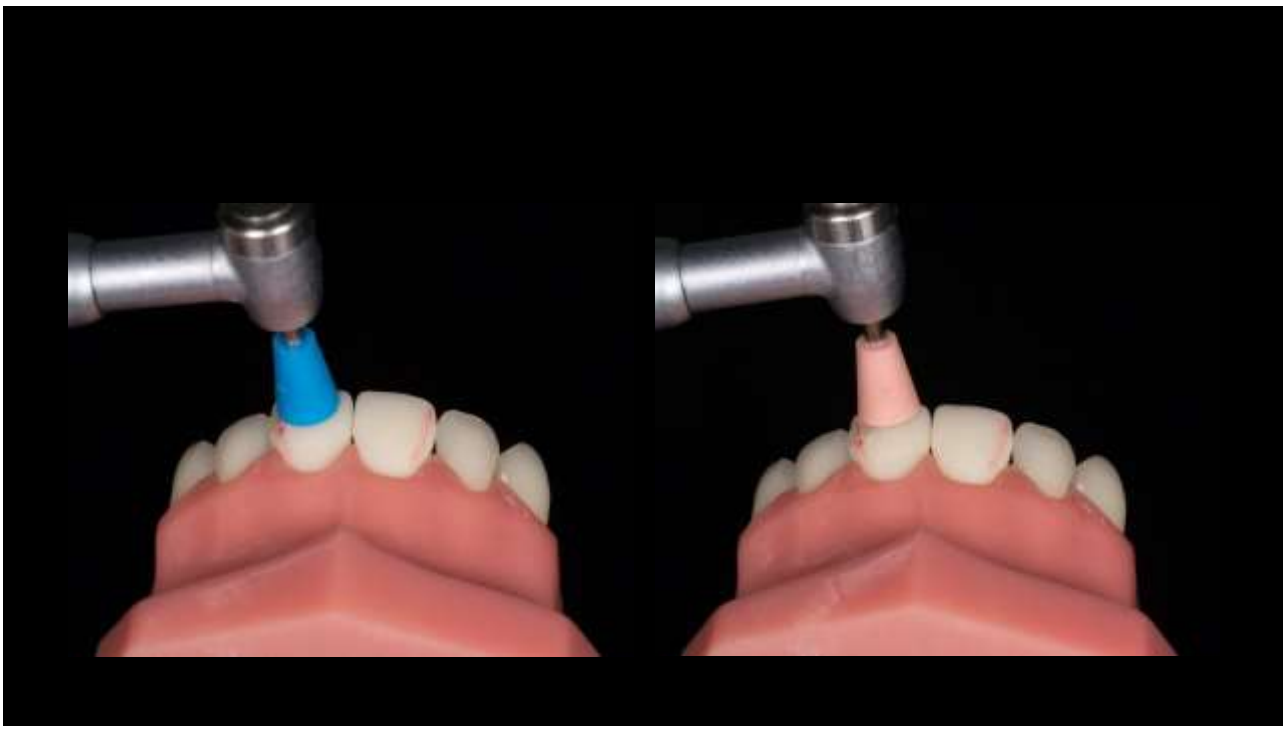
452

Flip discs when contouring interproximal

453

- Coarse
- Medium
- Fine
- Super Fine
- Polishing Pastes
- Aluminum Oxide Buff

454

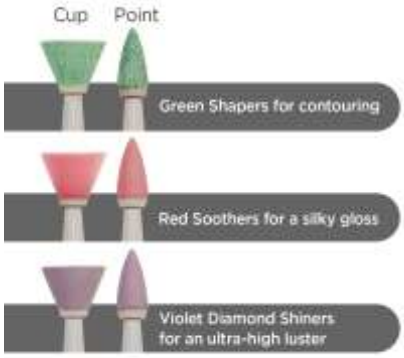


455

456

Jiffy Polishing System

457



Absolute Polishers (Parkell)

458

Polishing Systems

459

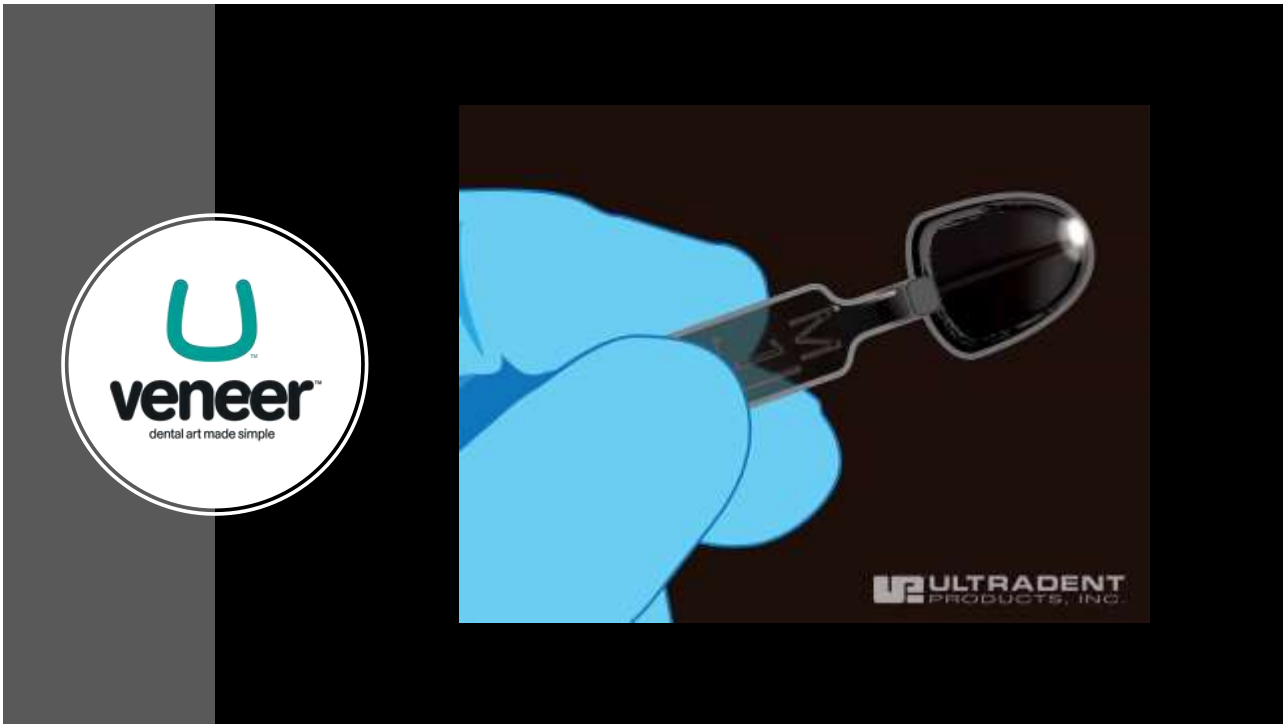
CONSISTENCY

IT'S ALL ABOUT THE LITTLE DETAILS

460

Template Developed Bonding

461


veneer
dental art made simple
ULTRADENT
PRODUCTS, INC.

462

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dental art made simple
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PRODUCTS, INC.

463

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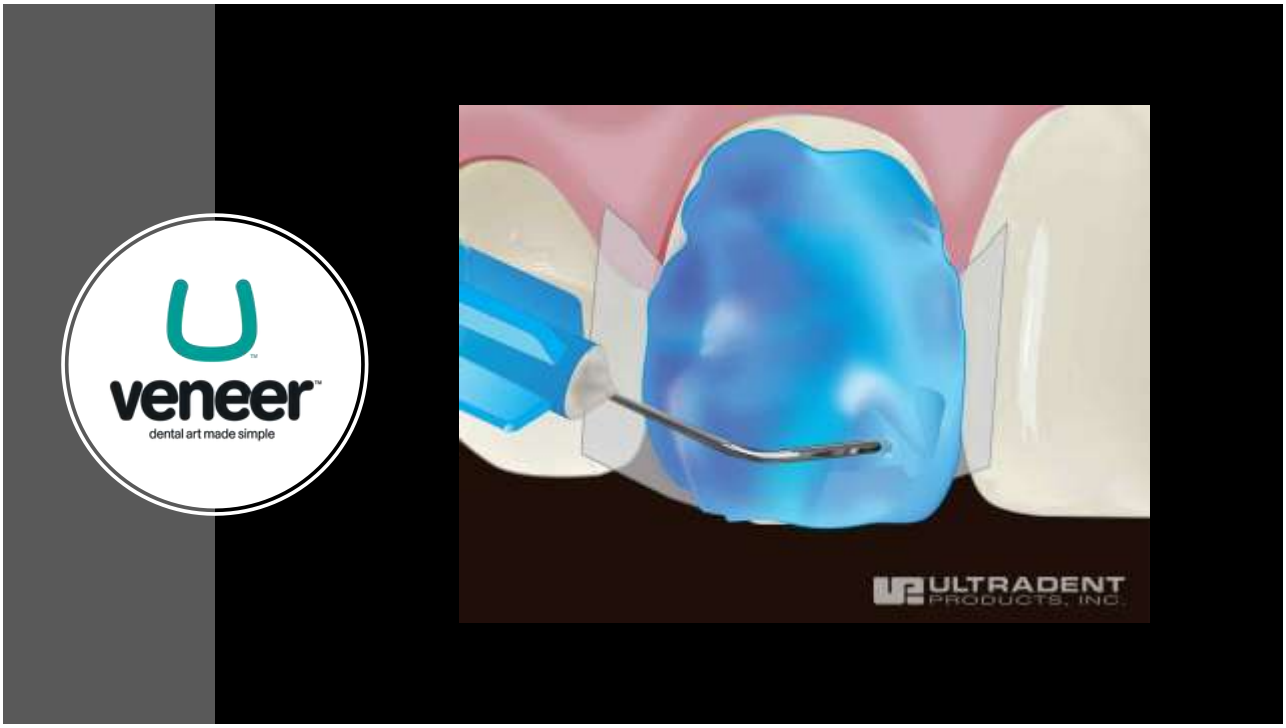
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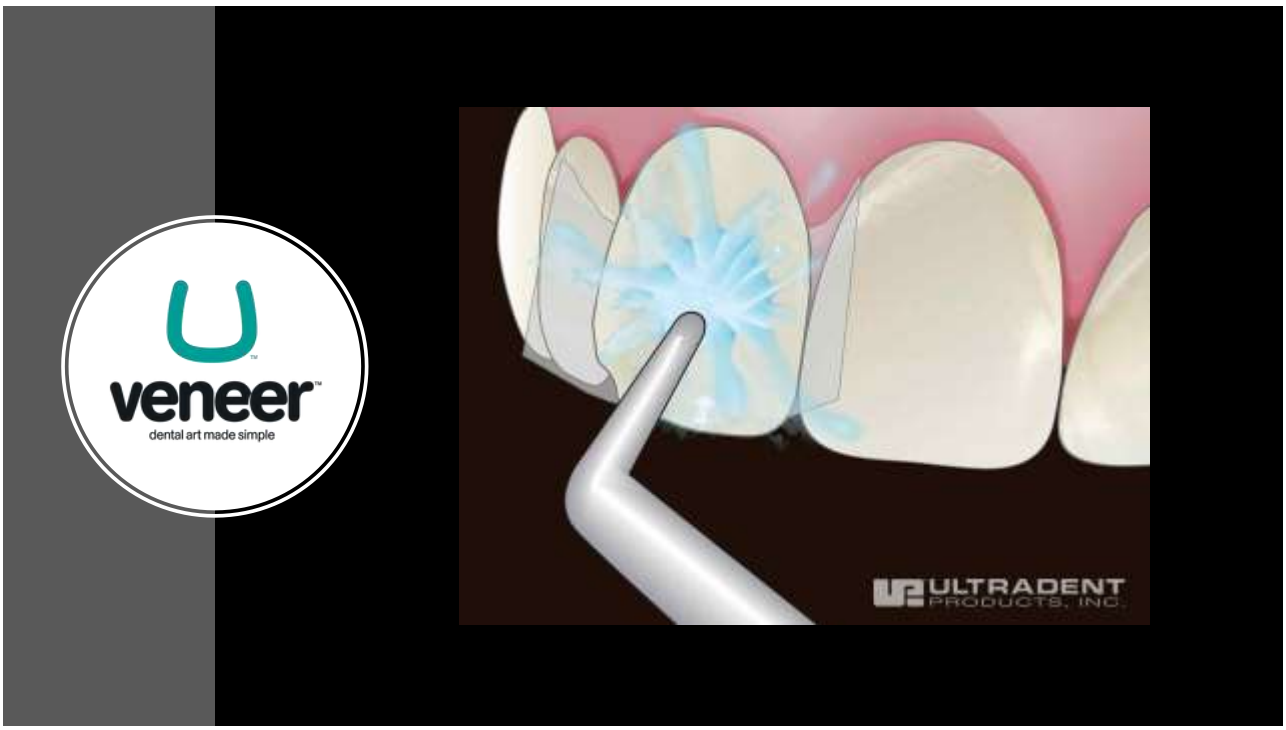
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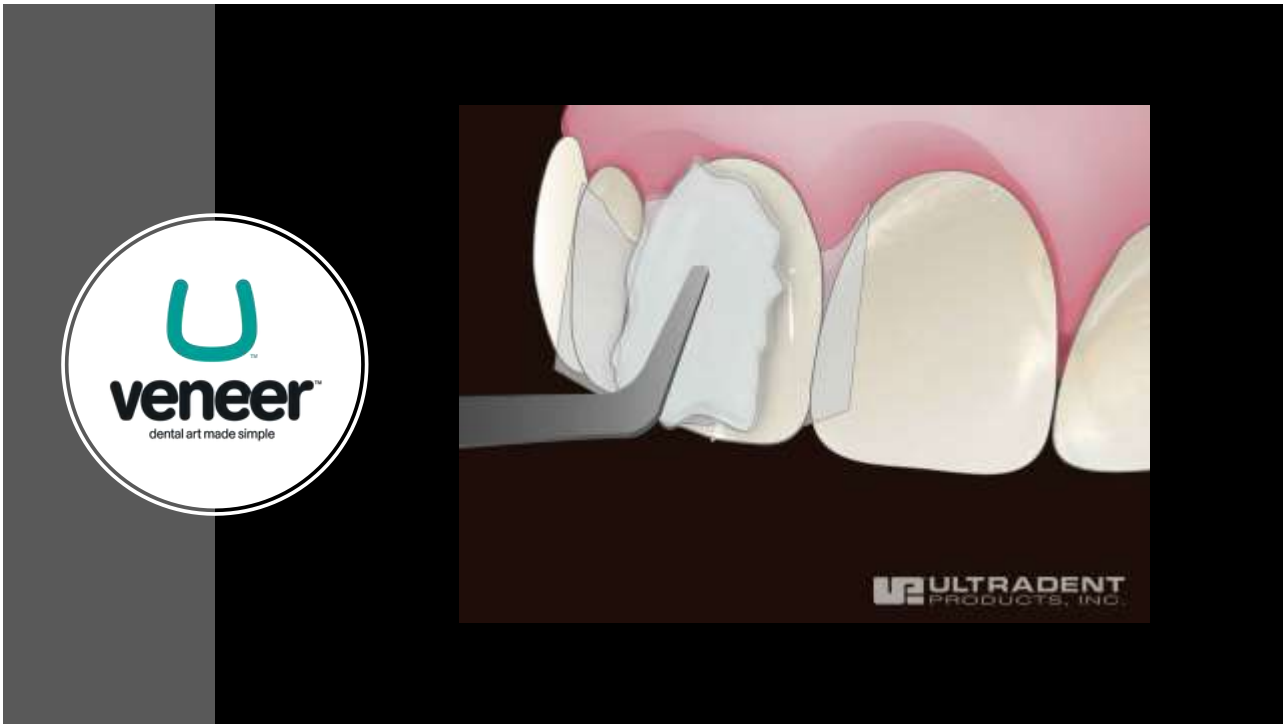
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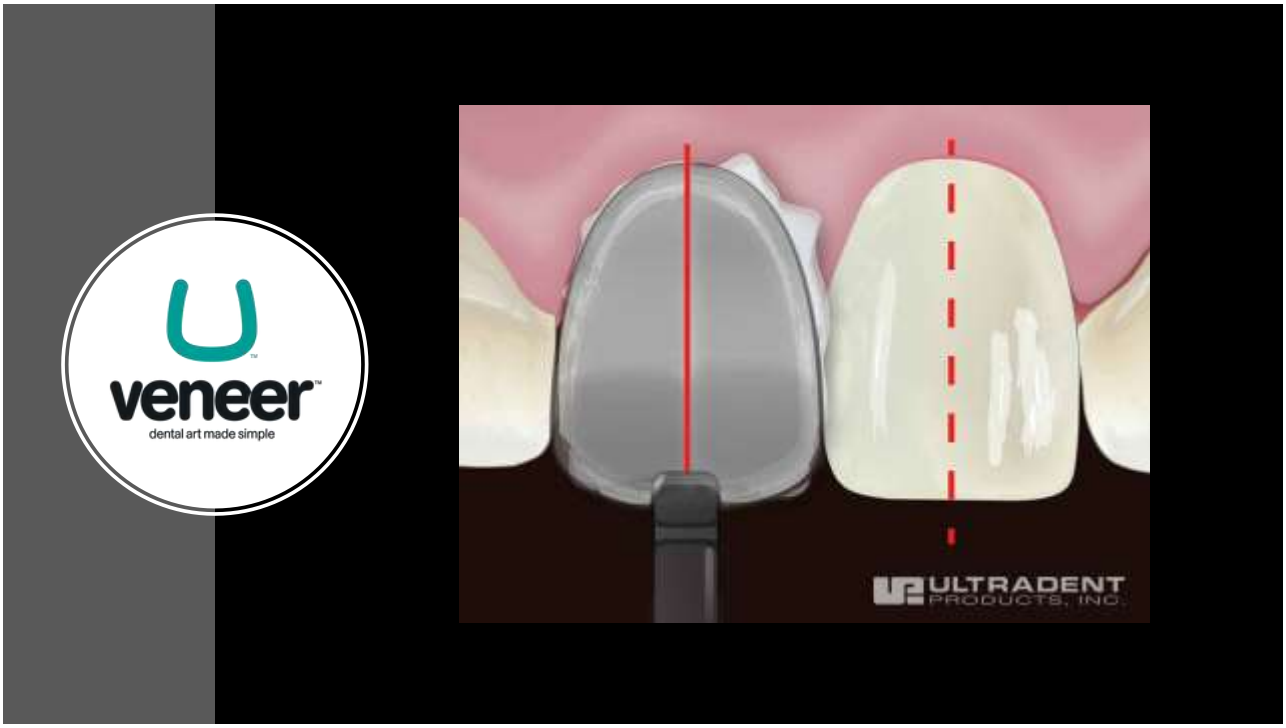
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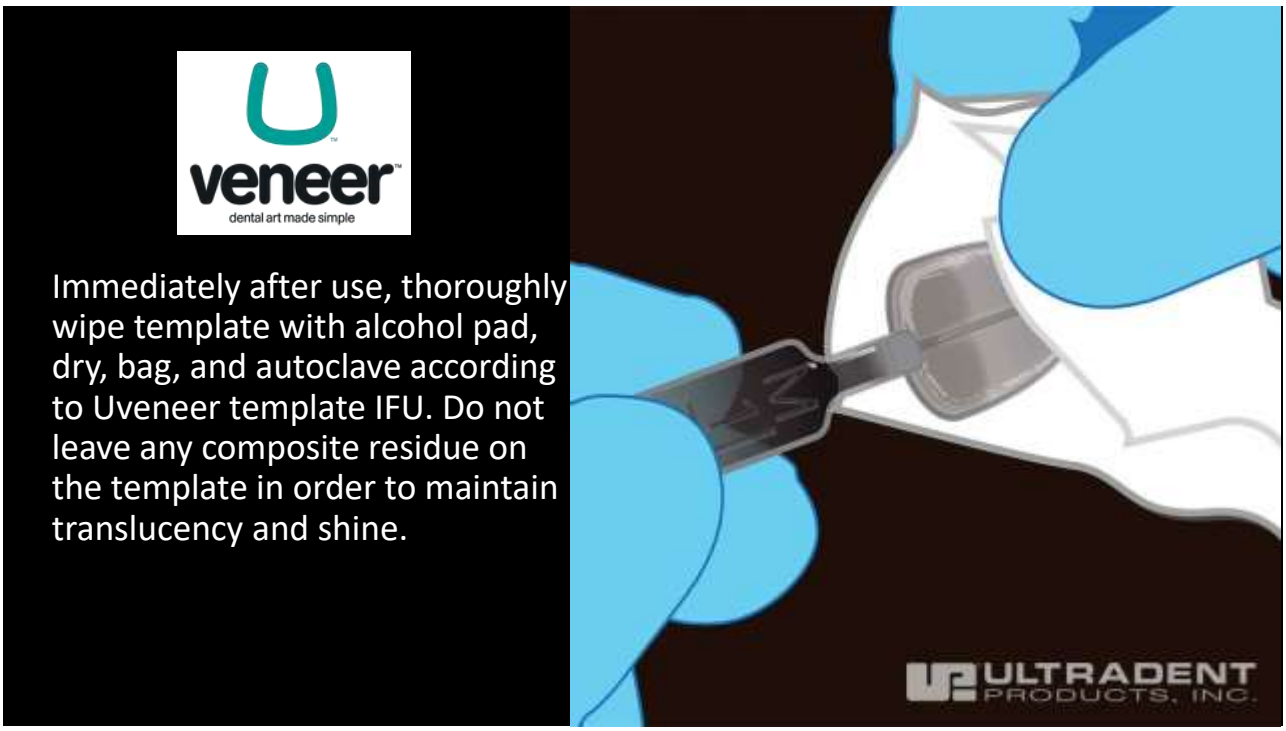
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Immediately after use, thoroughly wipe template with alcohol pad, dry, bag, and autoclave according to Uveneer template IFU. Do not leave any composite residue on the template in order to maintain translucency and shine.
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Temporary Veneers:
Follow the same steps for direct composite veneers but spot etch with Ultra-Etch® and adhere with ClearTemp® LC or preferred etch and adhesive.
Mock Ups:
Follow the same steps for direct composite veneers but do not prep, bond, or etch.

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