The Team Approach to Effective Laboratory Communication

- We are equal partners
- Our goal is to please the patient (aka the Real Boss)
- Win-Win

Respect

- Treat me as a partner, not an underling
- Stop by my lab to meet my team
- Don’t insult me by telling me I am too expensive
- When something does not work, do your part to help remedy the situation

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Respect

- Treat me as a partner, not an underling
- Stop by my lab to meet my team
- Don’t insult me by telling me I am too expensive
- When something does not work, do your part to help remedy the situation
- Don’t degrade me to your patients
I Need to Send It Back to the Lab ‘cause the Lab Screwed Up AGAIN

• If lab screws up why are you sending it back to THEM?

Tell Me What You Want

And I’ll Give You What You Need

Everything the Lab would Love to tell you, but is Afraid to Ask For!

• Give me a readable impression

It has been reported that 89% of impressions surveyed had 1 or more observable errors

You Want Me to do What?

You Want Me to do What?
Hemostasis/Retraction

Cord plain or impregnated

- Dry, no liquids to affect bonding
- Easy to dispense without tangles

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Hemostatic Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expasyl</td>
<td>Kerr Aluminum Chloride</td>
</tr>
<tr>
<td>Traxodent</td>
<td>Premier Aluminum Chloride</td>
</tr>
<tr>
<td>Retraction Capsule</td>
<td>3M ESPE Aluminum Chloride</td>
</tr>
<tr>
<td>Magic Foam Cord</td>
<td>Coltene None</td>
</tr>
<tr>
<td>Access Edge</td>
<td>Centrix Aluminum Chloride</td>
</tr>
<tr>
<td>GingiTrac</td>
<td>Centrix Aluminum Sulfate</td>
</tr>
<tr>
<td>Dryz</td>
<td>Parkell Aluminum Chloride</td>
</tr>
</tbody>
</table>

Comments:
- Traxodent: Clay-based. White color. Place in sulcus for 5 minutes, compress with cotton cap, and remove material by rinsing with water. Syringe dispensed.
- Retraction Capsule: Blue color. Extrude material into the sulcus with extra fine tip; let dwell for 2 minutes, remove by rinsing with water. Use standard composite compule dispenser.
- Magic Foam Cord: Expanding vinyl polysiloxane material extruded from 50mL impression gun. Blue color. Place around prepared tooth, compress with cotton cap, remove from mouth in minimum 5 minutes, maximum 10 minutes.
- Access Edge: Clay-based. Light green color. Place in sulcus for 2 minutes, apply 2 minutes of compression using cotton caps, rinse with water to remove. Use standard composite compule dispenser.
- GingiTrac: Vinyl polysiloxane material extruded from 50mL impression gun. Light green color. Intraoral setting time is 2 minutes. Apply pressure while setting with cotton compule dispenser. Also available in unit-dose MinMix syringe without the need for 50mL impression gun.
- Dryz: Clay-based. Light green color. Place in sulcus for 2 minutes, apply 2 minutes of compression using cotton caps, and rinse with water to remove. Syringe dispensed.

Gingival Retraction System

Gingi-Trac

Taking Perfect First Impressions

- Preparation to marginal gingiva
- Pack cord and re-prepare apically to cord
- Remove cord and place Gingi-Trac
Taking Perfect First Impressions

- Remove after 5 minutes and evaluate
- Repeat until no bleeding (1-5 times)

Hemostasis/Retraction

- Comprecap
- Comprecap with hemostatic agent
- Cord plain or impregnated
- Electrosurgery
- Diode Laser

Diode Laser

- Picasso Lite
- Odyssey

Impression Materials

- Panasil
- Imprint 4
- Splash
- Aquasil Ultra Cordless

Panasil
Imprint IV
Aquasil Ultra
Lift body out-Insert plastic end

Aquasil Ultra
Un-screw cap & insert loaded tip
Aquasil Ultra

Infection Control

Barriers available

Grip & Cap Autoclavable

Aquasil Ultra

Size | Color       | Work Time | MRT | No. of Teeth | Fill Amount
--- | ----------- | -------- |-----|-------------|-------------
Single | Light Purple | 35" | 3'00" | 1 - 2 | .7 mL
Multi | Light Blue   | 1'00" | 4'30" | 3 - 4 | 1.6 mL

Everything the Lab would Love to tell you, but is Afraid to Ask For!

- Give me a readable impression
- Give me enough room

Ain’t no way
Everything the Lab would Love to tell you, but is Afraid to Ask For!

- Give me a readable impression
- Give me enough room
- Give me the option of asking for a new impression or new preparation

Let’s start over

Uses of Dental Photography
Laboratory Communication

“Singular Success”

Root fracture
Uses of Dental Photography Laboratory Communication

Paint tints onto shade tab

Uses of Dental Photography Laboratory Communication

Take photos and send to lab

Everything the Lab would Love to tell you, but is Afraid to Ask For!

• Give me a readable impression
• Give me enough room
• Give me the option of asking for a new impression or new preparation
• Give me pictures of the prep, adjacent teeth and the desired shade
• Give me a guide of desired incisal edge, midline, angulations, position of the anterior teeth & preferably impression of temps

“Singular Success”
Looks

versus

Longevity

Common Public Perception of a Crown

Sticks out like a headlight
Doesn’t match
Too opaque
Black line at gum

The All-Ceramic Restoration

All-Ceramic Restoration Advantages

- Increased translucency and vitality
- Supra-gingival margins possible
- Does not contain metal
- Potentially best esthetics

PFM vs All-Ceramic Crown
All-Ceramic Restoration Challenges

- More exacting and extensive preparation (except pure Zr)
- Often exacting cementation procedures
- Post-operative sensitivity
- More prone to fracture
- Often higher lab bill (not pure Zr)

All-Ceramic Selection Factors

- Esthetic expectations
- Specific tooth
- Occlusal habits and trauma
- Amount of tooth preparation
- Color of underlying tooth structure
- Periodontium biotype
- Type of core or post
- Bonding vs conventional cementation
- Cost
- Patient cooperation

All-Ceramic Restoration Materials-2015

- All Zirconia
- Porcelain fused to Zirconia
- Monolithic Lithium Disilicate
- Lithium Disilicate w/ cutback
- Pressed Ceramic
- Feldspathic

Feldspathic Porcelain

- Potential for best esthetic results
- Primary use-Laminate Veneers
- 60-70 MPa flexural strength
- Must be meticulously bonded

I want an extreme makeover

Retracted View

Lateral Views
Bonding Porcelain Laminate Veneers
Cement Do's and Don'ts

DO NOT USE:
- Self-Cured Cements (Contain elevated levels of Tertiary Amines which may yellow)
- Self-Curable Cements which you can add a dual-cured catalyst (May yellow)
- Dual-Cured Cements (May Yellow)

Bonding Porcelain Laminate Veneers
Cement Do’s and Don'ts

DO NOT USE:
- Self-Adhesive “Cem” Cements - lower bond strength - (12-15 MPA vs 24-36 MPA)
  - Rely X Unicem
  - Smart Cem
  - Bis Cem
  - G Cem
  - Mono Cem

Bonding Porcelain Laminate Veneers
Cement Do's and Don'ts

DO NOT USE:
- Self-Etching Primer (Poor enamel bonding)
  - MUST ACID ETCH ENAMEL

Bonding Porcelain Laminate Veneers
Cement Do's and Don'ts

DO USE:
- Fourth Generation Total Etch multi-bottle
- Fourth Generation Total Etch 2 component
- Fifth Generation Total Etch
- Universal Bond Total Etch Mode
Bonding Porcelain Laminate Veneers
Cement Do’s and Don’ts

DO USE:
- Light Cured Only Resin Cements

Choice 2

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Bonding Porcelain Laminate Veneers
Treatment of Porcelain Surface

- Only glass beads should be applied under pressure to internal surface of laminate
- If not etched apply 9% HF for 90 seconds

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Bonding Porcelain Laminate Veneers
Treatment of Porcelain Surface

- Wash thoroughly
- Ultrasonic in Et OH or apply 32-27% phosphoric acid to remove hexafluorosilica salts on surface if over-etched

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Bonding Porcelain Laminate Veneers
Treatment of Porcelain Surface

- 2 Forms of Silane
  - Pre-Hydrolyzed
  - Non-Hydrolyzed

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Bonding Porcelain Laminate Veneers
Treatment of Porcelain Surface

- Try in water soluble gels
- Clean in ultrasonic or apply phosphoric acid wash and dry thoroughly
Bonding Porcelain Laminate Veneers

Tooth Surface Preparation
- Place 32-37% Phosphoric Acid on enamel for 15 seconds then on dentin for 5 seconds
- Wash thoroughly and dry enamel but leave dentin moist
- Place GLUMA on exposed dentin

Bonding Porcelain Laminate Veneers

All Bond 2: Apply 3-5 coats A&B, gently air dry, light cure 10 sec, apply D/EBond do not light cure
- All-Bond 3 (ACE TE): Apply 1-2 coats of mixed, gently air dry and light-cure 10 sec
- One-Step Plus: Apply 1-2 coats, gently air dry and light cure for 10 sec
- All-Bond Universal: Apply 1-2 coats, lightly air dry at an angle and light cure for 10 sec

Bonding Porcelain Laminate Veneers

Placement
- Optional - with thick cements (Provi-Link)
  - Apply a thin layer of Porcelain Bonding Resin (HEMA free) to internal surface of veneer, do NOT light-cure
- Apply selected shade of CHOICE 2 to internal surface of veneer and guide into place
- Tack cure for 3-5 seconds, then remove excess cement

Bonding Porcelain Laminate Veneers

Placement
- Use rubber tip to remove excess
- Wave cure (1:1,000, one inch away)
- Use scaler to remove excess
- Floss contacts
- Place glycerin around margins and thoroughly cure for 1 minute from buccal and lingual

Bonding Porcelain Laminate Veneers

Final Adjustments
- Check occlusion in Centric Occlusion
- Carefully adjust protrusive and lateral excursions
- Smooth lingual with fine diamond football, white stone, successive points
- Have patient return in 2 weeks for photos and to check occlusion

Before

After

Laboratory prostheses fabricated by Valley Dental Arts Stillwater MN
Pressed High Leucite Ceramics (Empress)

- Requires minimum 1.5-2.0 mm reduction
- Lab waxes up, invests, burns out & presses
- Can be cutback and layered
- 120-150 MPA flexural strength
- Must be meticulously bonded
- For single crowns, inlays/onlays

Proportional Smile Design

RED Proportion

What happened here?

Photograph: revealing canted incisal plane

Proportional Smile Design

RED Proportion


**Recommended Treatment**
- All-porcelain bridge #9-11
- Porcelain laminate veneers #5-8, 12

**Accepted Treatment**
- All-porcelain bridge #9-11
- Porcelain laminate veneers #6-8

Apical Zenith distal to midline-electrosurgery (2003)
Retract gingiva with cord packer during margination
Completed preparations
Models
Temp's seated
Impressions taken at another appointment since electrosurgery
Restorations seated on model
Restorations on Soft-Tissue Model

Temps on Seating day

Scrub with pumice
Wash and dry
Try-in each laminate individually
Adjust tooth if internal
Adjust laminate if contact
Try-in all laminates together

Milky White tryin paste

Before

Laboratory prostheses fabricated by Valley Dental Arts Stillwater MN

After

Lithium Disilicate (E-Max)

- Strength and translucency
- Posterior crowns-monolithic
- Pressed or CAD produced
- Anterior crowns-w/ layered porcelain
- 360-400 MPA flexural strength
- Better to be bonded unless >1.0mm thick
- Best esthetics

Immediate Smile

Bond Bridge first, then seat laminates
Lithium Disilicate (E-Max)

Single Central Incisor Crown
• 2-5 Appointments
• Higher Fee

Remove facial composite
Remove AO composite
Remove most stain
Use peri probe to remove subgingival
Bond bleach white composite
Prepare tooth
Photo w/stump shade

Make custom temp for lab
• Make quick bis-acryl
• Laminate prep on facial
• Add composite and custom stains
Send photo and temp to lab

OR Make custom shade tab for lab
• Core Shade
• Add tints
• Overlay with Incisal Shade for value
Send photo and tab to lab

Laboratory prosthesis fabricated by Valley Dental Arts Stillwater MN
Monolithic E Max Crowns
Load to Failure*

*Data from Ivoclar/Vivadent

Selecting Bonding Agent w Duo-Link

<table>
<thead>
<tr>
<th>Bonding Agent</th>
<th>Clinical situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-Bond SE (light cure) + Duo-Link (Light Cured)</td>
<td>Vital tooth</td>
</tr>
<tr>
<td>All-Bond TE (light cure) + Duo-Link (Self Cured)</td>
<td>Endo tooth, post &amp; core</td>
</tr>
</tbody>
</table>

Bonding to Lithium Disilicate (Retentive)

<table>
<thead>
<tr>
<th>Dentin</th>
<th>Core</th>
<th>Li₂Si₂O₅</th>
<th>Resin Cement</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>15 MPa</td>
</tr>
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</table>

Bonding to Lithium Disilicate-(Non Retentive)

<table>
<thead>
<tr>
<th>Dentin</th>
<th>Core</th>
<th>Li₂Si₂O₅</th>
<th>Resin Cement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>35 MPa</td>
</tr>
</tbody>
</table>

Duo-Link Universal

- Increased radiopacity
- 2 shades-milky white & translucent
- Dual curing
- Completely cures w/o light exposure
- Easier cleanup
**Duo-Link Universal**

- Usable with Universal, total etch, self-etch bonding agents

**e Cement**

- All-inclusive kit
- Dual and light cure

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**Bonding Technique**

1. Anesthetize if vital
2. Place Divots with 330 bur
3. Be gentle: slight rock, then pull straight up
4. Wipe off tooth with wet cotton roll
5. Check margins w/explorer
6. Adjust tooth not intaglio surface of crown
7. Re-acidify surface with Phosphoric Acid
8. Wash and dry thoroughly
9. Apply silane (if not previously applied)
10. Wait 15 seconds and air dry avoiding water contamination
Dispense one drop each of Self-Etching Primer into well. Mix using handle end of brush. Solution will turn pink. Dual cured compatible (contains sodium benzene sulfonate).

Dip brush in well. Agitate into tooth for 30 seconds (so that calcium ions neutralize the acid). Lightly blow air to evaporate solvent for 20 seconds. (SE primers contain more solvent). Light Cure for 10 seconds.

Mix Cement and place in tooth. Lightly coat to avoid overfilling (hydraulic pressure can impede seating). Quickly seat crown and push down.

Hold crown down and use brush to remove excess cement. Hold crown, floss contact down and pull floss through. Wave cure margin 1 second. Use scaler to remove excess cement then explorer. Floss. Place glycerin around margins. Light cure for 1 minute.

Crown complete. Laboratory prosthesis fabricated by Valley Dental Arts Stillwater MN. Porcelain Fused to Zirconia.
"The proportion between the successive widths of the teeth as viewed from the frontal should remain constant as you move distally."

Without pre-existing constraints

"The majority chose central incisors that were as close to 0.75-0.78 width/height ratio as possible."

Effect of Crown Length & RED Proportion

As CTW & CIL increases LW & CW decreases
Effect of Crown Length & RED Proportion

Using Inter-Canine Width & CI Height to Determine CI Width

Divide inter-canine width by central incisor length to give a quotient

LOOKUP QUOTIENT IN CHART FOR RED & TOOTH SIZES

Using RED Proportion Charts

Calculating CI Width
Calculating LI Width

\[
\frac{36.2}{6.35} = 5.7 \text{ mm LI}
\]

Calculating Cuspid Width

\[
\frac{36.2}{9.5} = 3.8 \text{ mm C}
\]

Teeth Preparations

Laboratory Procedures

Mounted cast of temporaries
Matrix used for crown fabrication
Crowns on Model from Lab

Cementing to Zirconia

DO NOT TREAT WITH PHOSPHORIC ACID!

Dentin
Core
Zr

Resin Modified Glass Ionomer Cement

Retentive Zr Crown cement with Resin-Modified Glass Ionomer Cement (*Pre-Treatment optional)

Cementing to Zirconia

DO NOT TREAT WITH PHOSPHORIC ACID!

Dentin
Core
Zr

Resin Modified Glass Ionomer Cement

Retentive Zr Crown cement with Resin-Modified Glass Ionomer Cement (*Pre-Treatment optional)
Cementing to Zirconia

**DO NOT TREAT WITH PHOSPHORIC ACID!**

Dentin | Core | Zr
---|---|---
**Calcium Aluminate RMGI Cement**

- Retentive Zr Crown cement with Resin-Modified Glass Ionomer Cement (*Pre-Treatment optional)

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Bonding to Zirconia

Dentin | Core | Zr
---|---|---
**Resin Cement**

- Short/Tapered, Non-retentive Zr Crown adhesively bond with Resin Cement

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Z-Prime Plus (Surface Primer)

- Phosphate Monomer (MDP), BPDM, Et OH
- Indications
  - Zirconia (LAVA, Cercon, Implant)
  - Alumina (Procera)
  - Metal (Titanium, Non-Precious, Semi-precious, High Noble)
  - Composite Indirect
  - Endodontic Posts (Zirconia, Fiber, Metal)
  - Intra-oral repairs

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Bonding Zirconia Crowns

**Treatment of Zirconia Surface**

- **MDP to Zirconia**

  - Addition Reaction

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Bond Strengths to Intaglio Surface*

*Data from Bisco
Phosphates contaminate Zr surface

• Saliva contains phosphates that tie up receptor sites
• DO NOT clean with Phosphoric Acid

Phosphates contaminate Zr surface

• Treat contaminated surface with Ivoclean then apply Z Prime

Composition (wt%):
- Zirconium oxide 10 - 15
- Water 65 - 80
- Polyethylene glycol 8 - 10
- Sodium hydroxide ≤ 1 (pH = 13 - 13.5)
- Pigments, additives 4 - 5

Ivoclean

Effects of Saliva Contamination

<table>
<thead>
<tr>
<th>Contamination</th>
<th>Clean/Treat</th>
<th>SBS, MPa (n = 8)</th>
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</thead>
<tbody>
<tr>
<td>No contamination</td>
<td>Z-Prime</td>
<td>31.5 (8.4)*</td>
</tr>
<tr>
<td>Saliva Water</td>
<td>Water</td>
<td>20.6 (7.1)*</td>
</tr>
<tr>
<td>Saliva Ethanol</td>
<td>Ethanol</td>
<td>20.3 (4.2)*</td>
</tr>
<tr>
<td>Saliva Ivoclean</td>
<td>Ivoclean</td>
<td>32.0 (6.2)*</td>
</tr>
<tr>
<td>Saliva Sandblast</td>
<td>Sandblast</td>
<td>30.3 (6.7)*</td>
</tr>
<tr>
<td>Pre Z-Prime-Saliva Ethanol</td>
<td>Pre Z-Prime-Saliva Ethanol</td>
<td>28.8 (7.7)*</td>
</tr>
</tbody>
</table>

P < 0.05 (ANOVA, T-Test)

Porcelain fused to Zirconia (Lava, Cercon, Procera Zr)

- Strong core, but reported interface chipping
- 900-1100 MPA flexural strength (Zr)
- 90-160 MPA veneered ceramic
- Can be used for bridges
- Can use conventional cementation
- Opaqueness masks out metal posts
- Full-mouth rehabilitation

All Zirconia

- Opaque but glazes added
- Able to use on second molars
- Perhaps on grinders
- Less preparation needed
- Hard to make adjustments
- Promoted as gold alternative
- Economical, results so far are excellent
All Zirconia
- Wear of Enamel Antagonist to Ceramic Surfaces

DT Posts/XRO
- Quartz fiber post
- 825 MPa flexural strength
- Radiopaque
- Changing temperature changes color
- Excellent micro-mechanical retention

Core Flow
- High Compressive Strength (266 MPa)
- High Flexural Strength (129 MPa)
- Low 2.5% Polymerization volumetric shrinkage (for a resin core)
- Used as a cement for the post as well as the buildup
- Non-slumping
- Cuts like dentin

Core Flow
- Three Shades
  - White
  - Blue
  - Natural

All Bond TE
- Fourth Generation DBA
- Easy mixing dispenser
- Compatible with dual cure, light cure or self cure modes
- Only dual cured one drop adhesive!
Broken post removed

Post drill prepared 2/3’s length of root

Take radiographic to measure canal length

Try-in post

Clean post and dry

Apply Z Prime

Etch canal with Phosphoric Acid for 5 seconds

Irrigate thoroughly with water

Use paper points to dry canal

Click once and mix All Bond TE-ACE(All-Bond III)

Place 2 coats of bonding agent

Leave for 20 seconds

Use paper point to remove excess liquids

Evaporate for 20 seconds

Light cure through post for 10 seconds
Express Core Flow and shape
Light cure thoroughly
Building Up Core

Diode laser used to
crown lengthen and
increase ferrule

Initial Core Buildup

Thank You!

Daniel H. Ward, D.D.S. • Dentist

Comprehensive • Caring • Cosmetic