Porcelain Veneers Success Using Supra-gingival Dentistry

Jose Luis Ruiz DDS, FAGD
Director of:

Porcelain Veneers Success Using Supra-gingival Dentistry

The Smile has social, physiological and psychological aspects.

Dumas G. Presses Universitaires De France 1949-03617-000

Ruiz JL The Psychology of the Smile Journal of Cosmetic Dentistry December 2003

Emotional Effect

- Subjects with A.I. had significantly higher level of social avoidance
- Fewer subjects with A.I. were married or in a committed relationship
- People tend to see that a dental defect as A. I. can "take" one's facial attractiveness and possess a threat to one's social life.

Traditional Sub-gingival Crowns Are Destructive & Difficult & Short Lasting

Results Are Unpredictable; With Sub-gingival Crowns

Pt fractured # 8
Single Tooth Fracture

Finished
Treating The Worn Dentition

Veneers Last Longer and Look Better Than Crowns In The Esthetic Zone... Why
10 Year
But Only If We Use Supra-gingival, Minimally-invasive Techniques

What is Success with Porcelain Veneers?
1. Patient Satisfaction
2. Excellent Esthetic/Restorative Results
3. Longevity
What Failed?

What’s More Important Materials or Diagnosis?

Diagnosis I Key to Success with...
- Treatment acceptance
- Treatment planning sequence
- Treatment results
- Longevity...

Objectives...
- Understand how to Perform Proper Diagnosis, Design & Communication with Patient.
- Understand of specific requirements of restorative materials, bonding systems & proper techniques.
- How to Manage Occlusion for Longevity.

Disclosure

Jose-Luis Ruiz DDS

Full Time Private Practice, Los Angeles CA
Director, Los Angeles Institute of Esthetic Dentistry
CE Course Director, USC School of Dentistry
Instructor, Gordon Christensen’s PCC in Utah
Honorary Professor, Warwick University, UK
Associate Editor, Dentistry Today

• Unpaid clinical evaluator CR(A)
• Do Not receive honorarium from any company
• Past and Present Unpaid Clinical Consultant:
  3M ESPE; Heraeus Kulzer; Sirona; VOCO;
  Kuraray; Den-Mat; Sybron Kerr; Dentsply, and
  many others.

Los Angeles Institute Of Clinical Dentistry
2 Diagnosis

Dento-Facial Diagnosis and Occlusal Disease Management Systems

Team Driven Record Taking and Education

www.DrRuizOnline.com
When is Occlusion Important?

- When signs or symptoms of OD are evident
- When extensive restorative Dentistry is being planned!!!

Ruiz JL. Achieving Longevity in Esthetics by Proper Diagnosis and Management of "Occlusal Disease". 2007 Contemporary Esthetics Vol 11 (6); 24-30
Is Occlusion a Problem in Restorative Dentistry?

OD: How Serious?
Patients on Their Early 30's

Healthy

Why?

Occlusal Disease
Why is OD So Ignored?

- “Few Available Practical Occlusal Education”
- “JIP” & occlusion mixed together.
- It is made to be too complicated.
- Population not educated about OD

Occlusal Treatment for All?

- What Percentage of clinicians perform an occlusal examination routinely as part of comprehensive exam?

“L.D. Pankey wrote that only 2% of dentists...can diagnose, plan treatment and motivate patients to provide a comprehensive treatment plan.”

Ruiz JL. Occlusal Disease:Restorative consequences and Patient Education. Dentistry Today 2007;Sep 26(9):90-95
Ruiz JL. Achieving Longevity in Esthetics by Proper Diagnosis and Management of “Occlusal Disease”. 2007 Contemporary Esthetics Vol 11(6); 24-30

Occlusal Disease Management System

- Stage 1 Initial Occlusal Evaluation (all patients)
- Stage 2 Occlusal and TMJ Examination (as needed and accepted by patients)
- Stage 3 TMJ Examination or Referral to local expert
7 Signs and Symptoms of Occlusal Disease

- Pathological tooth wear, chipping or fracture
- Tooth hypersensitivity
- Tooth hypermobility
- Fremitus
- Abfractions
- Severe localized bone destruction (secondary to periodontal disease)
- Muscle pain and TMJ pain.


Extreme Hypersensitivity
7 Signs and Symptoms of Occlusal Disease

- Pathological tooth wear, chipping or fractures
- Tooth hypersensitivity
- Tooth hypermobility
- Tension
- Abrasions
- Severe localized bone destruction (secondary to periodontal disease)
- Muscle pain and TMJ pain.


Stage 1 = Discovery & Education

- Stage 1: Initial Occlusal Evaluation (all patients)
- Stage 2: Occlusal and TMJ Examination (as needed and accepted by patients)
- Stage 3: TMJ Examination or Referral to local expert

Ruiz JL. Occlusal Disease: Restorative consequences and Patient Education. Dentistry Today 2007 Sep 26;26(9):90-95
Ruiz JL. Achieving Longevity in Esthetics by Proper Diagnosis and Management of ‘Occlusal Disease’. 2007 Contemporary Esthetics Vol 11 No 12; 24-20

VALUBLE PATIENT EDUCATION
Patient Must Choose

2 Directions:
- Have non-elective treatment
- Full records (with the intention to do ideal dentistry)

Presentation of Initial Findings

Original Forms, etc…
“Occlusal Disease Diagnosis System”

- Stage 1 Initial Occlusal Evaluation (all patients)
- Stage 2 Occlusal and TMJ Examination (as needed and accepted by patients)
- Stage 3 TMJ Examination or Referral to local expert

Ruiz JL. Occlusal Disease: Restorative consequences and Patient Education. Dentistry Today 2007 Sep 26(9):90-95
Ruiz JL. Achieving Longevity in Esthetics by Proper Diagnosis and Management of “Occlusal Disease.” 2007 Contemporary Esthetics Vol 11(S) 24-30

The Record Taking Visit...

- To gather necessary information for final diagnosis.
- Permits an opportunity for communication of goals and limitations.
- Has 2 components…the occlusal portion (function), esthetic portion.

www.DrRuizOnLine.com
Team Driven Record Taking

Records for DFED + OD...
1. DFD Photograph Series
2. Panorex (optional)
3. Alginate impressions
4. Preliminary Face Bow (To be checked by dentist)
5. Bite or Zavita Jig (fill OD & TMJ Form)

DFD Esthetic Photographic Series
- 11 Photos
- 2 Face
- 4 Non-retracted Close ups
- 3 Retracted Close ups
- 2 Occlusal

Study Cast
CRA (800) 223-6569
High Quality Alginate Impressions by auxiliaries.
Stage 2
Questionnaire & 11 Step Clinical Evaluation...

1. Load test
2. First point of contact
3. Occlusal slide
4. Clinical Anterior Guidance & Canine Guidance
5. Range of motion
6. TMD noise
7. Frmitus/mobility
8. CDH
9. Cross/Open bite
10. Parafunction
11. Angle classification

Record Taking Visit, 25 Parameters & Smile Design

Communication!!!

Treating Worn Out Anterior Teeth!

“Dentist who ignore (Occlusion) TMJ can never be competent in smile design”
PE Dawson

What All Agree on…

3 Golden Rules Of Occlusion

1. Bilateral even contacts.
2. Posterior disclusion (anterior guidance & canine rise).
3. Unobstructed envelop of function.
1st Golden Rule: Even Contacts

Class III lever: Ideally, when the muscles contract, the teeth would hit evenly and the condyle would be seated in its ideal place.


Consequence of a Premature Contact...

Occlusal Avoidance Pattern
Occlusal Avoidance Pattern

2nd Rule: Posterior Disocclusion

• Lever III Forces
• Proprioception


Why Canine Guidance?

Porcelain Veneers...The Best Way to Correct Lack of Anterior Guidance

CR Slide
Regardless of cause, the most effective treatment for the effects of bruxism is perfection of the occlusion. PE Dawson


Parafunction...Anterior & Canine Guidance


Palatal Ridge & Guidance
Palatal Ridge


Envelop of Function

Dawson PE. Evaluation, Diagnosis and Treatment of Occlusal Problems. 1989 Mosby


Envelop of Function Violation= Lack of Adequate Overjet

Library of Congress #2005930209
Cast Evaluation & Trial Equilibration

- Anterior open bite
- Premature contacts...
- Lack of anterior guidance
- Parafunctions

OCCLUSAL & TMJ FORM

- Anterior open bite
- Premature contacts...
- Lack of anterior guidance
- Parafunctions

- Add porcelain to lingual
- "E" equilibrium
- Make ideal canines
- NG
"I Love My Comfortable Bite"
Success with the 3 Golden Rules of Occlusion
Occlusal Disease Management System 3 Day Workshop

www.DrRuizOnLine.com

3 Smile Design

Dr. Jose-Luis Ruiz

"The Dento-Facial Esthetic Diagnosis System"
How to Achieve Consistently Beautiful Smiles, not just Beautiful Teeth

1. Are they within acceptable limits?
2. Can they be corrected with restorative dentistry?
3. How? If not refer!
1. Occlusal Plane
2. Midline
3. Facial Symmetry

Facial Esthetics Dentistry

Facial Esthetics Dentistry

Facial Esthetics Dentistry

Facial Esthetics Dentistry
1. Dento-Facial Esthetics
2. Group Esthetics
3. Gingival Esthetics
4. Tooth Esthetics

6) Tooth Show (Smile)
- Varies with age & gender
- Young females show tooth up to gingival line
- A sign of youth!
- Notice if asymmetrical

7) Bucal Corridor
- A full (wide) smile is more attractive, think Julia Roberts.
- A lot of negative space is a sign of a narrow upper arch.

Rivera-Morales WC, Goldman BM. Are speech-based techniques for determining OVD reliable? Compendium December
Vig RG, Brundo GA. “Kinetics of Anterior Tooth Display” J Prosthet Dent. May 1978
2. Group Esthetics

3. Gingival Esthetics

4. Tooth Esthetics

Parameters 6-10
Asses the Patient Expectations, Before Committing!

Steps for Predictable Execution Using DED System

- Communication
- Diagnosis/Design
- Wax up & transfer in to the provisionals
- Alter provisionals until patient is satisfied
- Reproduce in Porcelain
- Confirm lab’s accurate reproduction
- Psychological management
1 Week Final Touch Ups

4. Tooth Preparation
Poor Preparation Leads to a Bonded Cementation Nightmare and Poor Results

Case Specific Tooth Preparation Using Waxups
1. Estimate preparation required based on wax up
2. Using preparation mock-ups
3. Using silicon matrix

Reduction from the External Final Outline
Mock Up Used For Preparation

TEMPORIZATION (MATERIALS)

Silicon Reduction Matrix
Ideal Preparation From Here

1mm Incisal (Tooth Reduction Depend on Wax-up)
1mm Incisal (Tooth Reduction Depend on Wax-up)

Cervical Margin 0.4

Use Pencil To Insure Reduction
0.6 Facial (Tooth Reduction Depends on Wax-up)

Use Pencil To Insure Reduction
Design Benefits
- Tooth supports porcelain.
- Bonding To Enamel
- More tooth conservation.
- Patient prefer it.

Tooth Conserving Supra-gingival Prep
Success with Veneers & Anterior Esthetics Using Supra-gingival Dentistry Workshop

3 Day Workshop
Los Angeles Institute

Dealing With Unique Problems At Preparation
Impression With Open Embrasures
• Oraseal Caulking (Ultradent)

Open Embrasures & Diastemas
Gingival Symmetry

Subtractive Gingivectomy
Faking Gingival Symmetry

[Images of teeth and faces showing before and after dental procedures]

[Images of teeth and faces showing before and after dental procedures]
5. Choosing Restorative Material & Color

Color…
The final color on Veneers is a combination of:
• Tooth color
• Cement Opacity
• Restoration color & opacity

Preoperative Bleaching
• Always bleach before veneers.
• Do not cement veneers within 2 weeks.
• Bleach after veneers if there color difference.
Preoperative Bleaching

- Always bleach before veneers.
- Do not cement veneers within 2 weeks.
- Bleach after veneers if there is color difference.

Translucency & Opacity

Managing Difference in Tooth Colors
Do Not Over Promise

For Maximum Esthetics PFZ

PFM?
Lab Communication

- Desired shade
- Prep shade
- Desired opacity
- Desired porcelain
- Approved provisionals cast, and bite for cross-bite

Provisionals

- BisAcrils
- Integrity (Dentsply)
- Structure (VOCO)
- Venus Temp (Heraeus)

- TemRex TNE (Temrex)
- Ultra Temp (Ultradent)

Thick wax
Provisionals

Options
- Chairside, cemented
- Chairside, leave-ins (Shrink rap)
- Laboratory premade

Assistant Booth Camp

Choosing Restorative Material
Metal-free Options for Anterior Esthetics Restorations

- Direct composite
- No prep Veneers (Lumineers)
- Minimal prep Veneers (layered porcelain)
- Deep prep or 360 Veneers (pressable)
- Full crown PFZ, cemented
Practice, Predictable and Beautiful Direct Composite Restorations: Including Full Mouth Composite Rehabilitation
2 Day Workshop

**BONDED INDIRECT PORCELAIN**

**Layered Feldspathic**
- Intrinsic color
- Thin (from 0.4)
- More skill technician needed
- Slightly less strong

**Pressable Feldspathic & Lithium D**
- Monochromatic
- 1–1.5 mm of space needed
- Easier technique for tech.
- Slightly more strong

**BONDED INDIRECT NON-METAL**

**Layered Feldspathic**
- VenusCeram
- d.SIGN
- Ceramco 3
- Creation
- Noritake
- Finesse
- Cerinate
- Vitadur Alpha
- Etc.

**Pressables Feldspathic**
- Empress
- VenusCeram Pressable
- Cerinate pressable
- OPC
- Finesse Pressable
- Authentic Pressable

**Lithium Disilicate**
- E-max HT
Translucency is Key!!!

At 7 Years

Opacious Porcelain

PFM crowns
Approved provisional are Cross Mounted.
10 Years Later

- Full Crown: 67.5-75.6%
- MOD Inlay: 27.2%
- MOD Onlay: 39.0%

Edelhoff D, Sorensen JA. Tooth Structure removal associated with various preparations... Int J Perio Rest Dent 2002 Vol 22 N32 4 1

Metal-free Inlays and Onlays

Ruiz JL, Christensen GS. Rational for Utilization of bonded non-metal onlays... Dentistry Today 2006 Vol 25 No 9 89
CLINICAL SUCCESS WITH NON-METAL ONLAYs

Barghi N & Barry TG. Clinical evaluation of etched porcelain onlays: a 4-year report. Compendium of Continuing Education in Dentistry. 27(7):697-98, 660, 661, 665


Reich SM, Wjehmann. Clinical Performance of Large all ceramic CAD/CAM... after 3 years. JADA 2004; 135: 605-607

Coelho Santos MFM, Mordelli RL, et al. Clinical Evaluation... Inlays & Onlays. Two Year. Operative Dent. 2004;29(2)
Clinical Success, Metal-Free Inlays and Onlays.
Ruiz JL, Christensen GJ, Sameni A et al.
Kramer N, Frankenberger R.
Clinical Performance of bonded leucite-reinforced glass ceramic inlays and onlays after 8 years. Dental Materials 2005 21,267-271

Indications
When Ever a Crown Would be Needed.
2 Years later…Longevity?

PFZ When?
- Dark teeth
- Deep preparations (no enamel)
- Sub-gingival margins
She Was Schedule For A Crown Elsewhere
Supragingival Dentistry
Better Dentistry!

6. Bonding & Cement for Veneers

- Resin Light Cure

**Ideal Characteristics?**

- Viscosity
- Try in pastes
- Color stability
- Ease of cleaning
- Cost

- Calibra (Dentsply)
- Accolade PV (Danville)
- Choice 2 (Bisco)
- Insure Lite (Cosmodent)
- Clearfil Esthetic Resin Cement (Kuraray)


Insure Lite (Cosmodent)
Clearfil Esthetic Resin Cement (Kuraray)
Dual Cure Cement?

- Calibra (Dentsply)
- Accolade PV (Danville)
- Choice 2 (Bisco)
- SureLife (Cosmodent)
- ClearFil Esthetic Resin Cement (Kuraray)


Bonding Systems

Enamel Adhesion...

1955 Michael Buonocore & 1960s Ray Bowen

- Etch enamel
- 37% phosphoric acid for 15-20 sec.
- 15-50% of bond strength*

Mode of Adhesion
- Micromechanical interlocking
- Wetting
- Interpenetration
- Chemical bonding

Anusavice 2003 Skinner's
Dentin Adhesives... Generations 1-3

- 30% Organic material
- 30% Fluid
- smear layer
- Bis-GMA is hydrophobic

2 Families of Dentin Bonding Systems

**Etch & Rinse**
- 2 Bottle (4th Generation)
- 1 Bottle (5th Generation)

**Self Etch**
- 2 Bottles (6th Generation)
- 1 Bottle (7th Generation)

4rd & 5th Generation Total Etch or Etch & Rinse
1 or 2 Bottles

- Scotch Bond Multi-Purpose (3M Espe)
- Tenure A & B Den-Mat
- Optibond FL (Kerr)
- Gluma Bond + Desensitizer (Heraeus)
- Optibond Solo (Kerr)
- PQ1 (Ultradent)
- Prime and Bond NT (Dentsply)
- Single Bond (3M)

Fourqvist (1979) Total etch
Nakabayashi (1982) Hydrophilic resin and Hybrid layer
Hybrid layer

Resin tag

1. Etch
2. Dentin Primer (Hydrophilic resin)
3. Bond (Hydrophobic resin)

E&R Complications

1. Moisture Control
2. PO Sensitivity

PO Sensitivity!!!

CRA December 2003 Vol. 27 issue 11/12
Survey 4446 Dentist:
No post-op sensitivity: SE 24% & TE 12%
More than 11% Severe Sensitivity: SE 4% & TE 17%


Bond Strength = Success? What Really Matters?

Predictable Clinical Success
• Strong adhesion
• No post-op sensitivity
• Proper seal
• Ease of use
• Durability

Literature is Inconsistent
• 1MPa = 1 lb / 4.44 mm²
• Shear Bond Strength?
• Microtensile?

Sixth & Seventh Generation, Self Etch
• Clearfil SE Bond (Kuraray)
• Clearfil Protect Bond
• zinc (Glasst Decorator’s)
• One-Up Bond II (J. Morita)
• Peak II (Ultradent)
• Transbond XT (3M)
• CS Bond (Q2T)
• I-Bond (Heraeus Kulzer)
• All-in-One (Kerr)
• Easy Bond (3M ESPE)
1. Etch & Dentin Primer
2. Adhesive Resin

Self Etch
Sixth (2 Bottle) & Seventh (1 Bottle) Generation

Predictable Clinical Success
- Strong adhesion
- No post-op sensitivity
- Proper seal
- Ease of use
- Durability

Advantages... Clinically Forgiving On Moisture!!!

Tay TB, Gwinnett AJ. Sex 6t: Micromorphological spectrum for over-drying to accounting and sensitive dentin. Dental materials 1996; 12:236-


SE Bond Strength To Dentin?

25.46 MPa


Tayan LS. The clinical performance of one and two step self etch adhesive systems at one year. 2005 JADA Vol 136 May: 656

Longevity...Degradation of Bond to Dentin


Review of Turkun LS. The clinical performance of one and two step self etch adhesive systems at one year. 2005 JADA Vol 136 May: 656


Fatigue Testing...Degradation of Bond to Dentin

Marc Broom Microshear fatigue testing of tooth adhesives interface. Journal of adhesive Dent 2007 Vol 9 Supplement 2


Armstrong SR, Vargas MA, et al. Resin-dentin ultrastructure and MT dentin bond strength after 5 year...Operative Dent 2004; 29(6);705-712


### Etch Enamel with SE?... The Weak Link

J.L. Ruiz, W. Finger, T. Endo  Conventional and self-etching adhesive effects on retention of luting resins  Abstract IADR 2004


### Enamel Seal?

J.L. Ruiz, W. Finger, T. Endo  Conventional and self-etching adhesive effects on retention of luting resins  Abstract IADR 2004


Anauate-Netti C, J. Perdigao et al 2-Year Clinical Evaluation of Self-Etch Adhesives in Posterior Restorations AADR Abstract # 1090

### Can You Damage Dentin Bond with Etch, using SE Systems?

<table>
<thead>
<tr>
<th>Group Description</th>
<th>24 hrs</th>
<th>One Month</th>
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<tbody>
<tr>
<td>Total etch CSE</td>
<td>27.5 (5.3) A,a</td>
<td>25.6 (7.6) A,a</td>
</tr>
<tr>
<td>Self-etch CSE (Control)</td>
<td>34.4 (6.9) A,a</td>
<td>27.6 (8.6) A,a</td>
</tr>
<tr>
<td>Total etch OFL</td>
<td>29.0 (5.4) A,a</td>
<td>21.5 (6.1) B,a</td>
</tr>
<tr>
<td>Self-etch OFL (Control)</td>
<td>26.1 (9.0) A,a</td>
<td>23.7 (9.5) A,a</td>
</tr>
</tbody>
</table>

Ruiz JL, Kobashigawa A. AADR 2008 Abstract ID#: 0827
### Cement & Bond Individually Cured vs. Simultaneously Cure

<table>
<thead>
<tr>
<th>System</th>
<th>Individual Cure 1Hour</th>
<th>24 Hours</th>
<th>Simultaneous Cure</th>
<th>24 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Bond &amp; Esthetic Cement (self-etch system)</td>
<td>23.8 (4.4) [31A/69C]</td>
<td>45.8</td>
<td>27.2 (5.8) [58A/44C]</td>
<td>43.4</td>
</tr>
<tr>
<td>Single Bond &amp; Relipol (ABC)</td>
<td>27.2 (5.9) [56A/44C]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RX (self-etch system)</td>
<td>26.9 (3.0) [65A/70C]</td>
<td>48.6</td>
<td>26.9 (3.0) [65A/70C]</td>
<td>41.6</td>
</tr>
</tbody>
</table>

Rui, J., Powers J., Yapp R. “Bond Strength of Resin Cements to Dentin” IADR 2009 Abstract # 1816

### Good Materials = Bond? Yes, But…

Peumans M, Kaniewski F. Clinical effectiveness of contemporary adhesives: a systematic review of current clinical trials. Dent Mater. 2005 Sep;21(9):864-81


### SE Bonding Technique
Caries Elimination & Cavity Cleaners?

Fusayama T. Two layers of carious dentin: diagnosis and treatment. Oper Dent 1979;4:63-70

SE Bonding Technique

Conclusions… SE Vs E&R Bonding Systems

Engendered to Allow for predictable Clinical Success

• Strong adhesion
• Less post-op sensitivity
• Proper seal
• Ease of use
• Durability
Place All Veneers with Water or Clear Try-in Paste
Adjust Contacts

BEST PORCELAIN TREATMENT?

Effect of ceramic surface treatment on micro-tensile strength of ceramic american ceramic society.
Micro-shear bond strength of dual Cure cements to glass ceramics.

Tissue Management… Hemostasis

Rubber Dam?
Edward Swift Jr. DMD, MS 1112 11-2003


Isolation

Cement 2 at a Time

Garrison
Cement 2 at a Time

3 Sec Cure... Valo (Ultradent)

Initial Cement Removal... Don't Remove Cord, Avoid Bleeding.
Final Cure Using Oxygen Inhibitor

- Oxygen Inhibited layer is up to ½ mm thick.
- Could lead to margin ditching.

SoftFlex Disk (3M ESPE)
Dia-lite (Brasseler)

Final Margin Evaluation... Kincheloe

- Hu-Friedy
Gingival Retractor GRK1
After All Are in Place...

Video

Occlusal Adjustment

3 Golden Rules Of Occlusion
Repairing Porcelain

Veneer Repair
Thank you

Ruiz@DrRuiz.com