CONSERVATIVE DENTISTRY – MINIMALLY INVASIVE DENTISTRY

COMMUNICATION

COLLABORATION

DIAGNOSTIC DESIGN IMPLEMENTATION

DIAGNOSTIC Phase:

OUTCOME BASED:

WHITE ESTHETICS –

TOOTH SHAPE –
  ● Line Angle
  ● Outline form – “S” curve
  Reverse “S” curve

TOOTH SHAPE –
  ● Outline Form
  ● Profile
    Color
    Length
    Occlusion
    Speech
    Gingival Health
CENTRAL INCISOR - AGE
LATERAL INCISOR - GENDER
CANINE - PERSONALITY

TOOTH PROPORTION
- Width/Length Ratio

**Ideal Tooth Proportion**
- 75-80%
- Range 70-85%

Tooth Size:
- Average Central Incisor: Length 10.4 – 11.2 mm

Tooth Symmetry:
- Line Angle
- Outline form
- Profile
- Embrasures
- Contact Point
  - move from incisal to more apical position from central incisor to canine
  - in their progression should mimic the Smile line
Midline:

- Location
  - Facial (face)
  - Inter-arch (opposing arch)
  - Intra-arch (lip)
- Direction

A properly placed midline in conjunction with a long solid inter-proximal contact relationship between the two central incisors produces a desirable effect of “adhesiveness” or “oneness” of the dental composition.

*Lombardi, R.E.*

*The principles of visual perception and their clinical Application to denture esthetics, J Prosthet Dent 1973: 29:358-382*

AXIAL INCLINATION:

- Toward midline
- Increasing the further from midline

CANT:

- Parallel to the horizon

ARRANGEMENT:

- Follow arch form smoothly

SMILE LINE:

- Slightly convex, radiating symmetry

GOLDEN PROPORTION:

The established criteria of an average smile should not be interpreted as rules, but should be considered biological guideline. It is impossible to formulate an overall rigid rule for the visual characteristics of an attractive smile”

*Anthony H.L. Tian, Dr. Dent*

- Rule of 1.6:1
  Does this occur in nature?? GUIDELINE ONLY
PROTOTYPE Phase:

VENEER RESTORATIONS

A. Clinical Advantages:
   -- Conservation of tooth structure
   -- Excellent color matching capabilities
   -- Excellent periodontal biocompatibility

B. Clinical Applications:
   -- Discolored teeth
   -- Fractured teeth
   -- Worn teeth
   -- Diastemas

C. Failure
   -- Inappropriate tooth preparation
   -- Improper restorative choice
   -- Insufficient enamel for bonding
   -- Structural defect within porcelain

D. Preparation: “No Preparation”
   ● Lingually inclined teeth
   ● Peg laterals

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Incisal: 1.5 – 2.0 mm
- Determined from final incisal edge position
- Amount of unsupported porcelain (2-3 mm predictable)
- Rounded line angles/transition flowing

Facial: 0.5 – 1.0 mm
- Confined to enamel whenever possible allow for .5 – 1.0 mm of Veneer thickness
- Deeper for color masking (.5 mm + .2mm per shade modification)
- Subopaqueing
- Rounded line angles
- No undercuts

Interproximal: Break contact
- Break contact at minimum with fine finishing strip
- Use matrix as a critical guide to interproximal position
- Diastema closure or open gingival embrasure extend to Lingual proximal line angle & “1.0 mm” subgingival
- Remove proximal line angle
- Do not end in contact areas

Lingual: Shoulder
- 0.5 mm – 1.0 mm chamfer/butt joint
- Wrap onto lingual 1.0 mm
  - Determined by opposing contact with Mandibular incisors
  - Do not end on wear facet, especially Centric stops
- Rounded line angles

Fracture load and mode of failure of ceramic veneers with different preparations. Castelnuovo et al.(Univer.Wash), JFP Feb 2000, 171-180
- Strongest and remained intact with 2mm unsupported
- Advantage: Preparation, fabrication, manipulation, insertion
- 4mm unsupported Leucite-reinforced veneers fracture loads Equal

Margin: Supragingival .5 – 1.0 mm
- Smooth, sharp (decisive, well-defined)
- Preferably supragingival 0.5mm – 1.0 mm chamfer
- Rounded-line angles/transitions flowing
- Subgingival-sever color change, diastema closure or cervical
  Contour change
## CLASSIFICATION SYSTEM: Veneers

(Compendium 2013)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Facial Reduction</th>
<th>Dentin Exposed</th>
<th>Enamel Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL- I</td>
<td>Detectable with Magnification, with or without gingival finish line</td>
<td>Zero</td>
<td>95+ %</td>
</tr>
<tr>
<td>CL- II</td>
<td>Up to 0.5mm</td>
<td>10 – 20 %</td>
<td>80 – 95 %</td>
</tr>
<tr>
<td>CL- III</td>
<td>0.5 to 1mm</td>
<td>20 – 50 %</td>
<td>50 – 80 %</td>
</tr>
<tr>
<td>CL- IV</td>
<td>Conventional 1+mm</td>
<td>50+ %</td>
<td>&lt; or = 50 %</td>
</tr>
</tbody>
</table>

### WHEN TO VENEER?  WHEN TO CROWN?

Conservation of tooth structure with predictability
Predictability based on:

1. Unsupported porcelain
2. Remaining bondable enamel
3. Occlusion/Para functional habits

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VENEER vs. CROWN

Conservation of tooth structure with predictability
Predictability based on:

4. Unsupported porcelain
5. Remaining bondable enamel
6. Occlusion/Para functional habits

VENEER RESTORATIONS: How to decide how conservative you can be when conserving tooth structure?

- What factors are involved with conservative tooth preparation?
  ● Remove caries and old restorations
  ● Create room for the restorative material
    Allow the clinical situation to determine the restorative material
  ● Allow for contour change of final restoration
  ● Path of insertion

- Is there < 3 mm of unsupported porcelain from prepared tooth to
  The desired incisal edge position?
  - If pt. A bruxer, want <2mm
    Unsupported porcelain

- Is the remaining preparation in 50% or more enamel?
  YES – VENEER VERY PREDICTABLE

Crown is more predictable when:
  - Greater than 3 mm of unsupported porcelain from prepared tooth to
    The desired incisal edge position: or >2mm in Bruxers

Crown optimum from most esthetic-least esthetic

1. Bonded all-ceramic crowns
2. Cemented all ceramic crowns
3. Metal ceramic crowns

- Less than 50% of prepared Tooth in enamel or
  Significant sclerotic dentin
What is color of remaining Enamel & dentin?

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**VENEER PROTOTYPES ROLE:**
1. Stabilize teeth in place, preventing shifting while final restorations are being Fabricated.
2. Evaluation of gingival tissue, emergence profile, and stabilization of tissue.
3. Preview of final restorations:
   a. How do the restorations fit in the patients face?
   b. Get patients approval for contour and color.
4. Laboratory Communication

**ESTHETIC ISSUES:**
- Composite Mock-up or Direct Vacu-form Technique

**OCCLUSAL ISSUES:**
- Composite Mock-up or InDirect Technique

## VENEER RESTORATIONS: COMMUNICATION

### A. Preliminary Records
- Study/models
  - Maxilllary
  - Mandibular
  - Mounted with adjusted facebow

### B. Diagnostic Records
- Model & Dies
  - Diagnostic wax-up & or model
  - Of approved prototype restorations
  - Desired length of each central incisor
  - Incisal matrix
  - Bite registration
  - Two impressions or dies of
    - Properly prepared restoration
  - Desired length of each central incisor

<table>
<thead>
<tr>
<th>Study/models</th>
<th>Photographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Maxilllary</td>
<td>- 12 AACD view, “M” position</td>
</tr>
<tr>
<td>- Mandibular</td>
<td>- Eye brow – to- chin with stick bite</td>
</tr>
<tr>
<td>- Mounted with adjusted facebow</td>
<td>- Photos of pt desired look</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model &amp; Dies</th>
<th>Photographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Diagnostic wax-up &amp; or model</td>
<td>- Full face with prototype</td>
</tr>
<tr>
<td>- Of approved prototype restorations</td>
<td>restorations</td>
</tr>
<tr>
<td>- Desired length of each central incisor</td>
<td>- Eye brow – to chin with stick bite</td>
</tr>
<tr>
<td>- Incisal matrix</td>
<td>- Stump shade guide</td>
</tr>
<tr>
<td>- Bite registration</td>
<td>- Prototype restorations at</td>
</tr>
<tr>
<td>- Two impressions or dies of</td>
<td>1:2 smile, 1: 2&amp;1:1 retracted</td>
</tr>
<tr>
<td>Properly prepared restoration</td>
<td>- Drawing of the shade or color</td>
</tr>
<tr>
<td></td>
<td>Mapping desired</td>
</tr>
<tr>
<td></td>
<td>- Photos indicating incisal edge desired</td>
</tr>
</tbody>
</table>

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BASIC PRINCIPLES

Rubber Dam
ETCH
PRIME
Adhesive/BOND/Resin

TOTAL ETCH
Three Step System
Vs.
One Bottle System

SELF ETCH
All-In_one System
Vs.
Two Step System

TOTAL ETCH – 3 STEP SYSTEM
**Advantage:** Excellent Bonding Strengths-most consistent
Versatility – Use with self-cure and dual cure composites

**Disadvantage:** More steps associated with more clinical time
More steps can lead to more errors

*Van Meerheek B et al: Three year clinical effectiveness of four total-etch dentinal adhesive systems in cervical lesions. Quintessence 27(11) 775-784, 1996*

*Peutzfeldt A et al: A survey of the use of dentin-bonding systems in Denmark, Dent Mater 17(3) 211-216, 2001*

Manufactures:
- All-Bond 3 – Bisco
- Optibond/Fl – Kerr
- Probond-Dentsply/Caulk
- Syntac-Ivoclar Vivadent

- Bond-it! – Jeneric/Pentron
- Permaquick – Utradent
- Scothbond Multi-Purpose/Plus – 3M
TOTAL ETCH – ONE BOTTLE SYSTEM

Advantage: Good to Excellent bond strength
Fewer steps associated with time savings

Disadvantages: Post-Operative Sensitivity
?? Use with self-cure and dual-cure composites

Manufactures:
- Excite – Ivoclar Vivadent
- One-Step Bisco
- PQ1 – Ultradent
- Single Bond – 3M
- Gluma Comfort Bond & Desensitizer
- Opibond Solo Plus – Kerr
- Prime & Bond NT – Dentsply/Caulk
- Tenure Quick w/FL-Den-Mat

SELF ETCH – TWO STEP SYSTEM

Advantage: Good – Excellent Bond Strength
Minimal to no post-operative sensitivity
Versatility – use with self-cure and dual cure composites
Fewer steps associates with time savings

Disadvantage: Ability to bond to sclerotic dentin and enamel
Bond decrease over time

Manufactures:
- Clearfil SE – Kuraray
- A.R.T. Bond – Coltene/Whaledent
- iBond- Heraeus
- Clearfil Liner Bond 2V – Kuraray
- SE- All-Bond3 – Bisco

SELF ETCH – ALL-IN-ONE SYSTEM

Advantage: Fewer steps associated time savings
Quite low post-operative sensitivity

Disadvantages: Poor to Excellent Bond Strength
??? Use with self-cure and dual-cure composites
Durability of bond to enamel and dentin

Manufactures:
- Prompt-L-Pop – 3M
- Touch & Bond – Parkell
- One Up bond F – J Morita

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<table>
<thead>
<tr>
<th>Category</th>
<th>System</th>
<th>Steps</th>
<th>Etch</th>
<th>Prime</th>
<th>Bond/Adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL ETCH</td>
<td>Three Step</td>
<td>3</td>
<td>XXXX</td>
<td>XXXX</td>
<td>XXXX</td>
</tr>
<tr>
<td></td>
<td>One Bottle</td>
<td>2</td>
<td>XXXX</td>
<td></td>
<td>XXXX</td>
</tr>
<tr>
<td>SELF ETCH</td>
<td>Two Step</td>
<td>2</td>
<td>XXXX</td>
<td></td>
<td>XXXX</td>
</tr>
<tr>
<td></td>
<td>All-in One</td>
<td>1</td>
<td></td>
<td>XXXX</td>
<td></td>
</tr>
</tbody>
</table>

**SENSITIVITY ISSUES:**
- Over Etch
- Over Dry prior to prime
- Under dry after prime
- Agitate primer
- Light Curing unit
- Incremental fill
- C-factor
- Rubber dam isolation

**“BASIC” STEPS FOR TOTAL ETCH (3 STEPS) ALL-CERAMIC CEMENTATION**
(Bisco Total Etch All-Bond 3)

**TOOTH**

- Pumice tooth and rinse
- Rubber Dam placement
- ETCH 15-30 seconds H2PO4
- Rinse completely for 5+ seconds
- Partially dry and re-moisten with Antimicrobial
- PRIMER A & B- 2+ coats
- Blow thin 5 + seconds from a distance
- Light cure 10 seconds
- BOND resin, thin with brush
- Light-cure (Dual-cure) CEMENT

**ALL CERAMIC RESTORATIONS**

- Sandblast, rinse, ETCH 30-120 seconds HF3
- Use or rub with H2PO4 rinse/dry
- Porcelain PRIMER - Silante
- 2 coats and wait 60 seconds DRY
- BONDING agent, blow thin
- Light-cure (Dual-cure) CEMENT
- passive seating, remove excess cement
- Spot cure and remove remaining cement
- Light cure 40 seconds per surface

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“BASIC’ STEP FOR TOTAL ETCH (ONE BOTTLE) ALL-CERAMIC CEMENTATION”
(Bisco~ One Step)

<table>
<thead>
<tr>
<th>TOOTH</th>
<th>ALL CERAMIC RESTORATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Temporary, Pumice tooth</td>
<td>Remove try-in paste with 15 seconds of</td>
</tr>
<tr>
<td>Rinse, Lightly dry</td>
<td>strong water spray, dry</td>
</tr>
<tr>
<td>Rubber dam placement, Try in restoration</td>
<td>Sandblast, rinse, etch 30-120 seconds HF3</td>
</tr>
<tr>
<td>Etch 15-30 seconds H2PO4</td>
<td>Use or rub with H2PO4 ~ rinse/dry</td>
</tr>
<tr>
<td>Rinse completely for 5 + seconds</td>
<td>Porcelain PRIMER- Silane</td>
</tr>
<tr>
<td>Partially dry and re-moisten with Antimicrobial</td>
<td>2 coats and wait 60 seconds. DRY</td>
</tr>
<tr>
<td>Apply Primer/Adhesive for 15 seconds</td>
<td>Place in Light Proof Box (resin/Adhesive</td>
</tr>
<tr>
<td>Using scrubbing motion</td>
<td>is in Silane)</td>
</tr>
<tr>
<td>Blow thin 5 + seconds from a distance</td>
<td>Passive seating, remove excess cement</td>
</tr>
<tr>
<td>Light cure for 20 seconds</td>
<td>Spot cure and remove remaining cement</td>
</tr>
<tr>
<td>Light-cure (Dual cure) cement</td>
<td>Light cure minimum 40 sec per surface</td>
</tr>
</tbody>
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