Placing Beautiful, Long-Lasting Direct Anterior Restorations

2016 Greater New York Dental Meeting
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Daniel H Ward DDS
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- Private Practice-Columbus, Ohio
- Assistant Clinical Professor The Ohio State University-13 years

Daniel H Ward DDS
- Fellow Academy of General Dentistry
- Fellow American College of Dentists
- Fellow International College of Dentists
- Fellow American Society for Dental Aesthetics
- Associate Member American Academy of Esthetic Dentistry

Health and appearance conscious
The Public has concerns about:
Patients are more knowledgeable than ever

We must listen more to our patients

We must provide alternatives for our patients

…but the right alternatives

Minimally Invasive Dentistry

- Conservative approach
- Remove only diseased portion of tooth
- Preserve healthy tooth structure for future restorative needs
“Dentistry begets Dentistry”

“The more dentistry you do for a patient, the more dentistry they will eventually need.”

Treatment performed at age 18

- Black Triangles
- Opaque Crowns
- Dark Roots visible
- Recurrent decay

Smile Evaluation

- Long Central Incisors
- Inadequate buccal corridor display
- Steep Curve of Spee
- Color

Provisionalization

- Teeth Prepared-unprepared 2nd molars
- Fabricate desired shape in provisionals
- Allow patient to wear, evaluate and accept

Final Impressions & Lab Communication

- Once approved take final impressions-send model of provisionals
- Send photos of desired color shade tab, stump shades and provisionals
Final Impressions & Lab Communication

• Tryin and seat crowns
• Notice lower anterior teeth

Minimally Invasive Dentistry

15 Year Old

Munsell System

• Hue
• Chroma
• Value

Hue

Wavelength of Dominant Hue

700 nm 400 nm

Chroma

Saturation of Dominant Hue

Low Chroma High Chroma

Value

Reflectivity or Grayness of the Hue

Low Value High Value
Value
Black and White View

Low Value High Value

Similar Values
Color View
Different Hues

Similar Values
Black & White View
Chroma Removed

Hue
Wavelength of Dominant Hue

Chroma
Intensity of Dominant Hue

Value
Brightness or Amount of Gray
Practical Aspects

- Deep area more brown/yellow hue, more intense chroma, low value
- As you approach surface hue more blue/gray, less intense chroma, higher value

Direct Layering Techniques

- Buildup dentin replacement with opaque darker hybrid – typically A3-A3.5
- Buildup remaining form with shade similar to desired final color with hybrid (typically A1-A2)
- Add special effects to simulate imperfections within tooth structure
- Add translucent incisal hybrid or microfill
- Add A-2
  - Venus Pearl
  - Kalore
  - TPH Spectra
- Add A-1
- Add Characterization
  - Beautiful II
  - Aura Enamel must be invisible
  - Kalore GT
  - Esthetite Sigma Quick

Add dentin shade
- Aura
- Miris

Add Facial Surface
- Beautifu II

Add Characterization
- Important Junction
- Aura Enamel must be invisible
- Kalore GT
- Esthetite Sigma Quick

Finish and polish restoration
- Restore adjacent tooth
- Shape, finish and polish restorations

Restore opposite teeth
Pre-Operative

Roughen facial surface with diamond

Place and cut excess ends of matrix
Use Heliobond to adhere to gingiva

MPM in place sealed against gingival margin

Direct Contouring Techniques

Margin Perfect Matrix

Pre-Shaped matrix

Etch

Thoroughly wash and dry
Apply composite and adapt to sides

Use brush to push composite into corners

Trim with diamonds then finishing carbide burs

Finish and polish restoration
Shape, finish and polish restoration
Restore opposite tooth

Selective Etch Technique
- Apply etch to enamel only for 15 seconds
- Wash thoroughly
- Place self-etching primer

Technique & Treatment by Dr Paul Belevedere and Dr. Doug Lambert

Selective Etch Technique
- High Viscosity allows precise placement
- Contains BAC

Total, Self or Selective Etch
Universal Bonding Materials

Self-etch
Selective-etch
Total-etch
**Total, Self or Selective Etch**

*Universal Bonding Materials*

- Total-etch, self-etch or selective-etch technique
- Can be used for direct and indirect restorations
- Bond to all indirect substrates-metal, ceramics, zirconia, porcelain and lithium disilicate.
- Compatible with light-cured, self-cured and dual-cured composite and luting cements.

**Universal Bonding Materials**

- Total, Self or Selective Etch
- Single bottle for direct and indirect restorations
- High bond strengths to metal, ceramics, zirconia, porcelain & lithium disilicate.
- Compatible with light-cured, self-cured and dual-cured composite and luting cements since pH is 3.2
- Becomes hydrophobic upon setting

**Total, Self or Selective Etch**

*MDP Universal Bonding Materials*

**New Filler Technology**

Giomer Fillers

- Unique Filler particles made of set glass ionomer with special surface coating

**New Filler Technology**

- Agl Microfill Heliosil
- Micro-Hybrid Nano, Point, EsthetX, Venus
- NanoPac Flink Supreme
- Nano-Hybrid Venus Dental, Tetric Evo-Cem, Kibvo, Esmat

**All-Bond Universal**

- Total-etch, self-etch or selective-etch
- Single bottle for direct and indirect restorations
- High bond strengths to metal, ceramics, zirconia, porcelain & lithium disilicate.
- Compatible with light-cured, self-cured and dual-cured composite and luting cements since pH is 3.2
- Becomes hydrophobic upon setting
Low Shrinkage Composites

Nano/Hybrids in green

New Filler Technology
Spherical Fillers

- Easy polishing and retention
- Blends well into tooth structure

New Resin Technology
Nanofill/Hybrid

- Concern about bis-GMA
- Shrinkage of bis-GMA, TEGMA
- Higher molecular weight-less shrinkage
- New advances possible through resin technology
Increasing the size and molecular weight of monomers reduces overall shrinkage.

**Polymerization**

- Low Molecular weight: More Shrinkage
- High Molecular weight: Less Shrinkage

**New Resin Technology**
- Nanofill/Hybrid

**Non bis-GMA Composites**
- GC Products
- Kerr products
- Venus Pearl

**Curing Units**
- Light Output
- Columniation
- Angle of light tip

**Curing Units**
- Wavelengths
- Ergonomics
- Ease of Use

**US Population is Aging**

- Number of people aged 60+

**Population by Age: 1900-2050**

- Source: U.S. Bureau of the Census

**Percentage of people aged 60+**

- Source: U.S. Bureau of the Census

**US Population is Aging**
US Population is Aging

- Xerostomia
- Difficulty maintaining oral hygiene
- Root exposures
- Some unable to tolerate long appointments
- Difficulty coming to office
- Fixed Income

Don’t miss appointments
- Appreciative
- Pay bill
- Often need more treatment
- Refer new patients
- Say Thank You!

60+ Patients are Wonderful

US Population is Aging

Oral Environment Challenges-
Xerostomia

Multiple Medications

“40% of all prescription drugs have dry mouth listed in the PDR as a possible side effect”


Oral Environment Challenges-
Xerostomia

In a published study of 131 different prescribed medications the most common side effect cited was xerostomia.


Oral Environment Challenges-
Xerostomia

- Incidence increases with # of drugs taken
- 50% of patients taking 4 or more medications had Dry Mouth
Oral Environment Challenges - Carbohydrates

Nutrition Facts: Serving Size: 8.3 fl. oz; calories 140; total fat 0g; sodium 220mg; total carbs 28g; sugars 28g

Oral Environment Challenges - Antacids

Ingredients: Calcium carbonate, adipic acid, corn starch, crospovidone, dextrose, flavors, maltodextrin, sucrose, talc, colors.

Oral Environment Challenges - Bottled Water

Fluoride-less water  Fluoridated water

Oral Environment Challenges - Illegal Drugs

“Meth mouth” or chronic marijuana use

Need Therapeutic Restorations

- Xerostomia patients
- High carbohydrate users
- Non-fluoridated water users
- Drug abusers

Composite Challenges

- Post-operative sensitivity
- Recurrent decay
- Achieving proper moisture
- Polymerization shrinkage
- Increased time-layering
- Technique sensitivity

- Low post-op sensitivity
- Fluoride Release
- Moisture variability
- No shrinkage
- Bulk placement
- Simple-more forgiving

Glass Ionomer
Glass Ionomer Base/Restorative

- Fuji IX Self Cure Glass Ionomer
- SDI Self Cure Glass Ionomer

Glass Ionomer Characteristics

- More highly filled-reduced wear
- Self-curing in 2.5-5 minutes
- No polymerization (setting) shrinkage stress
- Expansion/contraction similar to tooth
- High fluoride release
- Bioactive

Glass Ionomer Uses

- Multiple cervical carious lesions
- Pediatric Patients
- Sealants
- Class V restorations
- Sandwich Technique
- Crown buildups
- Long term interim restorations
- Cements

Glass Ionomer Restorations

- High caries rate individuals
- Remove decay and place matrices
- Treat dentin with PAA

Glass Ionomer Restorations
Glass Ionomer Restorations

Place, shape and wait 2:30

Glass Ionomer Restorations

Shape with diamonds w/ water

Glass Ionomer Restorations

Dry and place Surface Sealant

No phosphoric acid

Glass Ionomer Restorations

High caries rate individuals

Glass Ionomer Restorations

Spoon out decay and refine prep

Glass Ionomer Restorations

Place and rinse Poly-acrylic acid
Mix Gi and quickly place and push out

Allow to set 2:30

Hold down gingiva and shape

Dry and place surface sealant

High caries rate individuals

• Acid/base and polymerization reaction
• Ionic and micromechanical bonding
• Dual-curing
• Fluoride release
• Bioactive
Resin-Modified Glass Ionomer Characteristics

- Acid/base and polymerization reactions
- Dual cured faster
- Shortens time needed to control moisture
- More esthetic and translucent
- Fluoride release
- Higher tensile, bond strength and wear

Resin-Modified Glass Ionomer Uses

- Liner or Base
- Class V Restorations
- Restoration Under Crown
- Temporary prior to crown
- Sandwich technique
- Cements

Resin-Modified Glass Ionomers-Advantages

- Better retention


37 pairs of caries-free unprepared abfraction lesions were treated with resin modified and resin composite restorations (single bottle total etch dba). Retention of the composite restorations at six months was below the minimum specified in the ADA Acceptance Program for Dentin and Enamel Adhesives. At two years retention was 96% for the resin-modified glass ionomer and 81% for the resin composite. The resin composite restorations generally had a better appearance, with a 100% alpha rating in color match, versus 83% for the resin-modified glass ionomer.

Resin-Modified Glass Ionomer Base/Restorative Capsule

Fuji II LC  RIVA LC

Resin-Modified Glass Ionomer Base/Restorative Paste-Paste

Ketac Nano  Fuji Filling LC

Class V Restoration
Gingival recession & root caries
- 1st molar and bicuspid
- Remove decay-place retention

Condition with PA
- Pre-treat with dentin conditioner (Poly-acrylic acid)

Material Placed and Light Cured
- Place excess material
- Light Cure

Final Restorations
- Shape restorations
- Hold back gingiva and shape with fine diamond
- Etch with phosphoric acid: wash and dry
- Place surface sealant and light cure

Glass Ionomer
- Exposed to occlusion
- Able to control moisture
- Not acid etching
- No shrinkage stress
- Highest fluoride release

Resin-Modified Glass Ionomer
- Out of occlusion
- Need quickness
- Need to acid etch
- Need to bond
- ↑translucence/esthetic

Glass Ionomer Preferred Uses
- Core-Cemented posterior crowns
- Entire Class I or II (Long Term Interim)
- Class V-high caries
- All deciduous posteriors
- Sandwich technique-Co Cure
Resin-Modified Glass Ionomer

- Core-all crowns
- Base Class I or II-re-prepared sandwich
- Class V-more esthetic
- Quickly placed short-term interim restorations

Glass Ionomers
The “missing link” of esthetic restorative materials

If you cannot see it, you cannot treat it!

Orascoptic Designs for Vision Surgitel

If you cannot see it, you cannot treat it!

Ultra-Light Optics
Nano Freedom DentLight

Several tooth to tooth width proportion theories exist

Golden Proportion
Golden Mean
Preston Proportion
Repeated Ratio......

Golden Proportion

"The width of the central incisors are in golden proportion to the width of the lateral incisors as seen from the front"

"The central incisors should be 25%, the lateral incisors 15%, and the canines 10% of the inter-canine width as seen from the front"


"The proportion between the successive widths of the teeth as viewed from the frontal should remain constant as you move distally"

Sample RED Proportions

<table>
<thead>
<tr>
<th>Same size Central Incisors</th>
<th>80%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>62%</td>
</tr>
</tbody>
</table>

Selecting RED Proportions

What is the effect of relative tooth height when selecting the appropriate RED Proportion?

How is the RED Proportion affected by the Central Incisor Width/Height Ratio?

Purpose of Preliminary Study

...to determine how dentists rate anterior tooth arrangements with different tooth-to-tooth width proportions and whether the best-ranked tooth proportions are affected by inciso-gingival tooth length.

Materials and Methods

Ideal Imaged Retracted Natural Smile

Results

549 dentists responded from 38 countries (470 from US or Canada counted)
Normal Length Smile

Preston Proportion
70% RED Proportion

Similar

Normal Length Smile

62% RED Proportion

Normal Length Smile

70% RED Proportion

Preferred

Normal Length Smile

80% RED Proportion

Very Tall Length Smile

70% RED Proportion

62% RED Proportion
“The majority (of dentists surveyed) chose central incisors that were as close to 0.75-0.78 width/height ratio as possible.”


Preferred RED Proportions

86% W/L Ratio

78% W/L Ratio

Width/Length Ratio of Central Incisors

Naturally Observed

Dentist Preferred


Summary Natural
Preston Proportion 86% W/L CI

Preferred RED Proportions
Relative Tooth heights
Very Short
Normal
Very Tall
Same inter-canine tooth width
May 2008 Dentistry Today

62% RED Proportion used with Tall Teeth

78% width/height ratio

70% RED Proportion used with Normal Teeth

80% RED Proportion used with Short Teeth

78% width/height ratio

RED Proportion Principles

- Central Incisor should maintain 78% width/height ratio
- The taller the central incisor the wider it should be
- The taller the central incisor the smaller the RED Proportion used
- The taller the central incisor the more dominant it becomes in the arch
- The wider the central incisor the narrower the resulting lateral incisor and canine

RED Proportion Principles

- The shorter the central incisor the narrower it should be
- The shorter the central incisor the larger the RED Proportion used
- The shorter the central incisor the more similar the relative individual tooth widths
- The narrower the central incisor the wider the resulting lateral incisor and canine
- Clinical judgment is paramount
Relating the Size of the Teeth to the Face

Short  Average  Tall

80% RED  70% RED  62% RED

Simplified RED Proportion Application

Using ICW and Relative Tooth Height to determine the sizes of the Maxillary Anterior Teeth

Simplified RED Proportion Application

Total intercuspid width (ICW) = Width of Central Incisor (CIW)

2(1 + RED + RED^2)

Simplified Clinical Application

Use Inter-Canine Width to Determine Ideal Central Incisor

Ward DH. Using the RED Proportion to Engineer the Perfect Smile. Dent Today 2008;27(8):112-117.
Simplified Clinical Application

<table>
<thead>
<tr>
<th>Tooth Height</th>
<th>RED</th>
<th>Central Incisor Width (in mm)</th>
<th>Lateral Incisor Width</th>
<th>Canine Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall</td>
<td>60% RED</td>
<td>4.5</td>
<td>3.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Average</td>
<td>50% RED</td>
<td>4.0</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Short</td>
<td>60% RED</td>
<td>4.0</td>
<td>3.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Very Short</td>
<td>80% RED</td>
<td>4.5</td>
<td>3.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

(with interpolations)

**STEP 1** - Determine Tooth Height

**TALL**

**AVERAGE**

**SHORT**

**STEP 2** - Measure Inter-Canine Width

**STEP 3a** - Divide Inter-Canine Width by factor for CIW

If average length = 4.4

70% RED

**STEP 3b** - Multiply CIW* 70% for Lateral Incisor Width

If average length = 4.4

70% RED

Using RED to determine individual tooth widths

Normal

ICW/4.4 = CIW

Ward DH. Using the RED Proportion to Engineer the Perfect Smile. Dent Today 2008;27(8):112-117.
STEP 3c: Multiply LIW * 70% for CW

If average length

70% RED

Using RED to determine individual tooth widths

Very Tall

STEP 3a: Divide Inter-Canine Width by factor

If very tall length

62% RED

STEP 3b: Multiply CIW * 62% for Lateral Incisor Width

If very tall length

62% RED

STEP 3c: Multiply LIW * 62% for Canine Width

If very tall length

62% RED

Using RED to determine individual tooth widths

Very Short

ICW/4.8 = CIW

Ward DH. Using the RED Proportion to Engineer the Perfect Smile. Dent Today 2008;27(8):112-117.
STEP 3a-Divide Inter-Canine Width by factor of 4.8
If very short length:

80% RED

STEP 3b-Multiply CIW * 80% for Lateral Incisor Width
If very short length:

80% RED

STEP 3c-Multiply LIW * 80% for Canine Width
If very short length:

80% RED

Cookies Cutter Smiles
- Smiles are too perfect
- Every smile looks the same (dentist, orthodontist or dental laboratory “trademark smile”)
- May not coincide with the physical and emotional makeup of the patient

Relationship of Personality and Tooth Form
- Correlating Face and Personality
  - Dynamic
  - Delicate
  - Stabile

Personalized Smiles Visagism
- Applies the principles of visual art to the composition of a smile
- Creates a smile that expresses the patient’s personality and lifestyle
- Ensures harmony between the restorations and the patient’s physical appearance, values.
• Flat incisal plane
• Rectangular central incisors
• Larger masculine lateral incisors
• Straight canine profile
• Straight across apical zeniths
• Flattened Curve of Spee

70% RED Proportion
78% W/L Ratio

• Flat incisal plane
• Rectangular central incisors
• Larger masculine lateral incisors
• Straight canine profile
• Straight across apical zeniths
• Flattened Curve of Spee

70% RED Proportion
78% W/L Ratio

• Curved incisal plane
• Oval central incisors
• Oval feminine lateral incisors
• Oval canine profile
• Oval apical zeniths
• Normal Curve of Spee

75% RED Proportion
78% W/L Ratio

• Flat incisal plane
• Square tapering central incisors
• Normal sized lateral incisors
• Cervical of aggressive canines out
• Ascending apical zeniths
• Normal Curve of Spee

80% RED Proportion
86% W/L Ratio

• Curved incisal plane
• Rectangular central incisors
• 70% RED lateral incisors
• Straight canine profile
• Straight across apical zeniths
• Curve of Spee

70% RED Proportion
78% W/L Ratio

• Curved incisal plane
• Rectangular central incisors
• 70% RED lateral incisors
• Straight canine profile
• Straight across apical zeniths
• Curve of Spee

70% RED Proportion
78% W/L Ratio

Smile Design: Bold

Smile Design: Dynamic

Smile Design: Sensitive

Smile Design: Passive

Smile Design: Perfect

Halle Berry
Smile Design Natural

- Straight incisal plane
- Natural-looking central incisors
- 66% RED lateral incisors
- Canine cervicals out
- Shorter lateral apical zeniths
- Slight Curve of Spee

Natural width Proportion
78% W/L Ratio

Smile Design Bold

- Flat incisal plane
- Rectangular central incisors-square FGM
- Larger masculine lateral incisors
- Straight canine profile
- Straight across apical zeniths
- Flattened Curve of Spee

70% RED Proportion
78% W/L Ratio

Smile Design Dynamic

- V-Shaped incisal plane
- Large square tapering central incisors
- Smaller lateral incisors
- Cervical of aggressive canines out
- Ascending apical zeniths

Golden Proportion
78% W/L Ratio

Will Smith

Brad Pitt

Kate Middleton
Curved incisal plane
• Oval central incisors
• Oval feminine lateral incisors
• Oval canine profile
• Oval apical zeniths
• Normal Curve of Spee

Smile Design
Serene
75% RED Proportion
78% W/L Ratio

Julia Roberts

Flat incisal plane
• Square central incisor
• Lateral incisor more similar in size to central
• Perpendicular passive canines with curved profile
• Slightly curved apical zeniths
• Flattened Curve of Spee

Smile Design
Passive
80% RED Proportion
86% W/L Ratio

Smile Design
Imperfect/Passive
70% RED Proportion
86% W/L Ratio

Uneven incisal plane
• Shovel-shaped central incisors
• Twisted lateral incisor
• Cervical in and cervical out canine profiles
• Ascending apical zeniths
• Flat Curve of Spee

Angelina Jolie

Thank You!
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