Digital Dental Photography: Seeing is Believing

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20th Century Public Perception of Dentistry
- Disease Oriented Treatment

Diagnostic Tools
- Tooth Centered Treatment

Diagnostic Tools
- Tooth Centered Treatment

The Public Perception of Dentistry is Changing
- Smile Oriented Treatment
The Public Perception of Dentistry is *Changing*

- Smile Oriented Treatment

Diagnostic Tools

- Smile Centered Treatment

Diagnostic Tools

- Smile Centered Treatment

Dental Photography

An essential tool for today's dentist

Dental Photography

Film based

Digital based

Digital Photography—Advantages

- Instant Image
- Multiple pictures at no additional cost
- Ability to manipulate images
- Ease of displaying, storing, sending and transporting images
- High-tech image to patients
- Use in PowerPoint presentations
SLR Cameras

A Day at the Office

Uses of Dental Photography
- Diagnostic
- Patient Communication
- Laboratory Communication
- Communication w/ Specialists
- Communication w/ Insurance Co
- Medical/Legal
- Self-Evaluation
- Lectures, Publications, Accreditation

Uses of Dental Photography
Diagnostic
- Golden Proportion
- RED Proportion
- 1:16 House Rule
- 78% width/height ratio
- Measurement of tooth dimensions

Uses of Dental Photography
Patient Communication
- Allows them to see what you see

Uses of Dental Photography
Patient Communication
- Pre-Planning Desired Results
- Chairside Patient Involvement
**Uses of Dental Photography**

**Patient Communication**

- Educates with facts
- “Hey, I like your piercing”
- Imaged Full Face Smiles
- Your Treatment Capabilities
- Adjacent teeth and tooth structure
- Periodontists, Orthodontists, Endodontists, Oral Surgeons, Pathologists
Uses of Dental Photography
Communication w/ Specialists

Communication w/ Specialists

What is this?

Fractured Porcelain invisible to radiographic inspection

Filing accident reports

Medical/Legal

Documentation
Uses of Dental Photography

Full-face Photographs

- Standard HIPPA release
- Teaching release
- Complete release

Obtaining releases

(Outside legal advice should be sought)

Uses of Dental Photography

Self-Evaluation

Learning from every case

Uses of Dental Photography

Lectures, Publications, Accreditation

- ASDA
- AACD
- AAED

Aesthetic Organizations

Dentistry Today-May 2007

Denture Tryins

Study Clubs, Conferences, Universities
Digital Photographic Principles

- Lens
- Exposure
- Aperture
- Flash
- Standardized Magnification

Digital Photographic Principles

- 24-35mm - wide angle - "fish eye"
- 50mm-standard view
- 85-300-telephoto view - "flat image"
- Dental lens is 85-105mm telephoto macro

Digital Photographic Principles

- 35mm View
- 105mm View

Digital Photographic Principles

- Quantity of light that reaches the sensor

Digital Photographic Principles

- Size of the lens opening
- Length of time lens open or length of time flash illuminated
Aperture is size of the opening of a lens

- Referred to as f stop

- Smaller the diameter of the opening the larger is the number
  - f/32

- Larger the diameter of the opening the smaller is the number
  - f/2.5

- Larger number f/stop (smaller opening) gives greater depth of field
  - f/32

- Smaller number f/stop (larger opening) makes it easier for focusing
  - f/2.5

- Shutter in flash photography is set to be entirely open long enough to allow all of flash to reach sensor
Digital Photographic Principles

Flash

- In flash photography, length of exposure is determined by the amount of time the flash is illuminated.

- Digital TTL metering uses a pre-flash to pre-determine appropriate time for flash.

Proper Tooth Exposure

- Camera attempts to balance light for all pictures.
- May need to overexpose +1-1.5 f stops to compensate for white teeth.

Ring flash gives more even distribution of light—used for intra-oral views.
- Point flash away from lens eliminates red eye and is more 3 dimensional—used for full face views.

- Dual-point flash best for facial view of anterior teeth.

Magnification refers to the ratio of image size to object size.
- 1:2 means object size is double the size of the image.
- 1:1 means image on film is same as image.
Most currently available sensors are smaller than 35mm film and magnify image by approximately 1.5

Standard 35mm film is 24mm x 36mm

Digital sensors are smaller than film size

Resulting image is magnified 1.5 X

Standard Digital SLR Viewfinder

1:2 magnification
Digital Photographic Principles
Standardized Magnification

- Standard Digital SLR Viewfinder
  - 1:3 magnification (0.5m away)
  - 1:2 magnification (0.4m away)

Digital Photographic Principles

1:10 (1:15 digital)
1:2 (1:3 digital)

Full Face Horizontal
1:10 (1:15 digital)

Full Smile View
1:2 (1:3 digital)

Frontal Closeup View
1:1 (1:1.5 digital)

Multiply magnification X 1.5

Digital Dental Cameras

- Modified Consumer Fixed Lens
- Dental Designed Fixed Lens
- Single Lens Reflex (SLR)
- Lens
- Flash
- Accessories
- Sources

Digital Dental Cameras

- Modified Consumer-fixed lens

CH E A P!

Digital Dental Cameras

- Modified-Consumer fixed lens

Canon G-16
Digital Dental Cameras
- Dental designed fixed lens

**Easy!**

Shofu Eye Special C-II

- 12 megapixel-SD
- Lightweight
- Auto focus & zoom
- Dual-point flash

Digital Dental Cameras
- Dental designed fixed lens

**Quality!**

Shofu Eye Special C-II

- On-Screen display
- Touch panel interface
- Programmed modes
- Only takes photo when in proper range

Digital Dental Cameras
- Single Lens Reflex (SLR)
Digital Dental Cameras

- **Single Lens Reflex (SLR)**

  - Do Not Recommend Live View

Nikon D-7100

- 24 megapixel
- 1080P HD Video

$2700-3300

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Digital Dental Cameras

- **Single Lens Reflex (SLR)**

  - 18 megapixel
  - 1080P HD Video
  - Easiest to setup
  - Best value

Canon T5

$1900-2500

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Digital Dental Cameras

- **Lens**

  - Sigma
  - Brand name

Sigma EM 140

- Dual Point

Canon MR 14

- EX

Proprietary

Sigma EM 140 DG-Dual Point

Canon MR 14-EX

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Digital Dental Cameras

- Wireless Ring Flash
  Metz MS-1

Digital Dental Cameras

- Flash-Dual Point
  Canon MT-24 EX  Nikon R1 Wireless

Digital Dental Cameras

- Accessories
  Mirrors

Digital Dental Cameras

- Accessories
  Occlusal Mirror
  Buccal Mirror
  Combination Mirror

Digital Dental Cameras

- Accessories
  Full and Split Cheek Retractors

Digital Dental Cameras

- Accessories
  One-piece Cheek Retractors
Digital Dental Cameras

- Sources
- Local
- Mail order/Internet
- Specialized dental camera companies

Digital Dental Cameras

- Sources

Local-National Camera Chains

Digital Dental Cameras

- Sources

Mail Order-BHPhotoVideo.com

Avoid Gray Market

Digital Dental Cameras

- Sources

Dental: Clinipix, Lester Dine, Photo-Med

Digital Dental Cameras

- Sources

Technical Support

Technical Support
Digital Dental Cameras

- If you want to call yourself a "cosmetic" dentist
- If you want to effectively communicate with your patients and laboratory
- If you want to treat Maxillary Anterior Teeth with Indirect Restorations
- If you want to be able to defend yourself in a Court of Law

Then BUY, BUY, BUY a professional digital dental camera tomorrow!

Downloading & Manipulating Images

- Direct Input
- Memory cards
- Dental Imaging Programs

Direct Input

Memory Cards

Memory Card Reader

PCMCIA port

Direct card driver

Eye Fi Wireless
**Downloading & Printing Images**

**Memory Cards**

- SD Card in camera
- In-Office Wireless

**Eye Fi Wireless**

- Desktop Shortcut
- Target Folder

**File Formats**

- RAW - ability to fully manipulate exposure
- TIFF - better detail
- JPEG - generally most widely used
- Compression - OK if limited

**Imaging Programs**

- Photoshop Elements
- Paint Shop Pro
- Microsoft Digital Image Suite
- Photoshop

**Memory Cards**

- Image stored on memory card

- SD Compact Flash
Photoshop Elements

Quick Fix Mode/Smart Fix

Before

After

Downloading & Printing Images

Imaging Programs
- Viper Soft
- SciCan Image FX
- Digident Digital Dentist

Dental Imaging Programs

Downloading & Printing Images

Imaging Programs

Dental Imaging Libraries

Proportion-based Imaging

This is possible!
**Downloading & Printing Images**

**Imaging Programs**
- Smile Vision
- Laboratory performed
  - Pre-op Photo
  - Template*
  - Imaged Photo*

*Valley Dental Arts

**Outsourced Imaging**

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**Taking a**

**“Photographic Full Series”**

- Camera Setup
- Step-Exposure preparation
- Image standardization
- Standard views
- Proper positioning

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**Shofu Camera Setup**

- Turn on camera
- Select mode
- Move to proper range
- Frame Image
- Shoot!

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**SLR Camera Setup**

- ISO 200
- Flash Sync speed 1/200 second
- Aperture Priority (Av setting)
- Over exposure override +0.5-1.5 f-stops
- Full face (1:10 but 1:15 digital) at f 8 or 11
- Full smile (1:2 but 1:3 digital) at f 22 or 32
- Closeup (1:1 but 1:1.5 digital) at f 32
- Manual focus

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**Exposure Preparation**

**Turn the Camera On**

- Most have 30 second automatic shutoff
- Set mode to Aperture Priority (Av)
- Set ISO-200 (or 400)

**Step 1a**

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**Exposure Preparation**

**Turn the Flash On**

- Set to TTL
- Set Exposure to +1

**Step 1b**

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**Exposure Preparation**

**Set the Aperture**
- f 8 or 11 for full face
- f 22 for all others

**Step 2**

**Exposure Preparation**

**Set the Magnification**
- Manual focus
- Pre-set magnification

**Step 3**

**Exposure Preparation**

**Position the Patient**
- Place pt in front of backdrop
- Lean patient in chair
- Stand over patient

**Step 4**

**Exposure Preparation**

**Focus and Shoot**
- Move camera to focus
- SHOOT!

**Step 5**

**Exposure Preparation**

**Review of Steps**
- Camera on, flash on
- *Set f stop*
- Set magnification
- Position patient
- Move to Focus and SHOOT

**Step 6**

**Image Standardization**

*AACD Required Views*
*Full Face View 1:10 (1:15 digital)*

f/8 or f11

**Full Face View**

<table>
<thead>
<tr>
<th>Chair</th>
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<tbody>
<tr>
<td>• Standing or seated upright</td>
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<tr>
<td>• Same height or slightly higher</td>
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| Mirror, retractor, other |
| • Backdrop |

| Orientation |
| • Prefer border just below Interpupillary line |
| • Centered with vertical midline |

**Full Face View**

- Use Background
- Patient forward 6”
- Parallel
- Move carefully to focus
- Autofocus with floor reference-alternative
- Several exposures

**Frontal Portrait View 1:10 (1:15 digital)**

f/8 or f11

**Frontal Portrait View**

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</table>

| Mirror, retractor, other |
| • Backdrop |
| • Camera rotated 90° clockwise |

| Orientation |
| • Centered with vertical midline |
| • Inferior border at clavicle |

**Frontal Portrait View**

- Patient forward 6” of background
- Sit or stand
- Camera rotated 90 degrees
- Parallel
- Focus carefully or autofocus reference
Full Smile View

- Chair
  - Seated, chair reclined 45°
  - Directly over pt or turn pt
- Mirror, retractors, other
  - None
- Orientation
  - Centered between central incisors
  - Centered with incisal plane

Full Smile View

- Seat patient in chair
- Tilt back 45 degrees
- Stand over patient
- Line up parallel
- Move to focus

Full Smile Lateral Views

- Chair
  - Seated, chair reclined 45°
- Mirror, retractors, other
  - None
- Orientation
  - Parallel to incisal plane
  - Center at lateral incisor
Frontal Retracted View

- Seated, chair reclined 45°
- 2 full retractors
- Teeth slightly separated
- Mirror, retractors, other
- Orientation
- Centered and parallel to incisal plane
- Centered between central incisors
- Space between incisal planes

Max Ant Frontal View

- Open mouth
- Bring retractors up
- Chair
- Seated, chair reclined 45°
- 2 full retractors pushing upward
- Teeth separated
- Mirror, retractors, other
- Orientation
- Centered to and between central incisors
- Contraster optional

Chair

- Max Ant Frontal View 1:1 (1:1.5 digital)
- Max Anterior Frontal View
- Seated, chair reclined 45°
- 2 full retractors pushing upward
- Teeth separated
- Mirror, retractors, other
- Orientation
- Centered to and between central incisors
- Contraster optional
### Max Ant Lateral Views

**Chair**
- Seated, chair reclined 45°
- Teeth separated

**Flash**
- Ring

**Orientation**
- Centered with incisal plane

- 2 full retractors
- 1 firm, 1 loose
- Pulling upward

- Teeth separated
- Parallel to facial plane of lateral

- Centered with lateral incisor

### Maxillary Anterior Lateral Views

- Open mouth
- Bring retractors up
- Center at lateral

### Maxillary Occlusal View

**Chair**
- Seated, chair reclined up to 60°

**Mirror, retractors, other**
- Mirror, retractors, other
- Place mirror on upper lip
- Centered with occlusal plane
- Includes Incisors & 2nd molars

**Orientation**
- Centered with occlusal plane

### Maxillary Occlusal View

- Tilt pt back 60 degrees
- Retractors In
- Place mirror
- Dry with air or pre-warm in water
- Angle to include incisors and back molars
- Avoid showing the nose!
**Mandibular occlusal view 1:2 (1:3) digital**

- Seated, chair reclined 20°
- 2 split retractors
- Includes Incisors & 2nd molars
- Mirror, retractors, other
- Warmed mirrors or air syringe dried
- Tilt pt up 20 degrees
- Retractors in
- Place mirror
- Dry with air or pre-warm in water

**Mandibular Occlusal View**

<table>
<thead>
<tr>
<th>Chair</th>
<th>Flash</th>
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<tbody>
<tr>
<td>• Seated, chair</td>
<td>• Ring</td>
</tr>
<tr>
<td>reclined 20°</td>
<td></td>
</tr>
<tr>
<td>Mirror, retractors,</td>
<td>Orientation</td>
</tr>
<tr>
<td>other</td>
<td>• Centered with</td>
</tr>
<tr>
<td>• Mirror, retractor</td>
<td>occlusal plane</td>
</tr>
<tr>
<td>• ring</td>
<td>• Includes Incisors</td>
</tr>
<tr>
<td>• 2 split retractors</td>
<td>&amp; 2nd molars</td>
</tr>
<tr>
<td>• 3D Occlusal mirror</td>
<td></td>
</tr>
<tr>
<td>• centered above</td>
<td></td>
</tr>
<tr>
<td>• occlusal plane</td>
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**R&L Buccal 2:3 (1:2.25)**

- Full Retractor on photographer side
- Mirror holding out cheek

**Practice Makes Perfect**

START TODAY!