Digital
1. FinePix S2 Pro
   Fuji Film

Film
1. TTL Ring and Point System
   Nikon/Pentax
2. Yashica Dental Eye III
   Kyocera
The digital revolution is in full bloom in clinical photography. And just like anything else digital, new models are popping up at an increasingly fast pace. Many digital cameras can also rival those using film when it comes to price, although the “prosumer” (see below) and professional digital SLR (single lens reflex) setups are still significantly more expensive than a comparable 35mm unit. Nevertheless, the advantages of the digital products have probably already overtaken film except for the extreme purists among us.

### Digital vs. Film

<table>
<thead>
<tr>
<th><strong>DIGITAL ADVANTAGES</strong></th>
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<tbody>
<tr>
<td>+ Immediate image — no waiting, allows immediate retakes when necessary</td>
<td></td>
</tr>
<tr>
<td>+ No film</td>
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<tr>
<td>+ No processing</td>
<td></td>
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<tr>
<td>+ No scanning</td>
<td></td>
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<tr>
<td>+ No need to shoot dupes</td>
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<table>
<thead>
<tr>
<th><strong>DIGITAL DISADVANTAGES</strong></th>
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<tbody>
<tr>
<td>– Cost</td>
<td></td>
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<tr>
<td>– Weight</td>
<td></td>
</tr>
<tr>
<td>– Size</td>
<td></td>
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<tr>
<td>– Images must be transferred to computer</td>
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<thead>
<tr>
<th><strong>FILM ADVANTAGES</strong></th>
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<tbody>
<tr>
<td>+ Still arguably best color and clarity</td>
<td></td>
</tr>
<tr>
<td>+ Cost</td>
<td></td>
</tr>
<tr>
<td>+ Doesn’t require high tech equipment</td>
<td></td>
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<tr>
<td>+ Can be shot as slides or prints</td>
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<thead>
<tr>
<th><strong>FILM DISADVANTAGES</strong></th>
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<tbody>
<tr>
<td>– Must buy and stock film</td>
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<tr>
<td>– Best dupes are multiple originals</td>
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<tr>
<td>– Must be scanned for PowerPoint</td>
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<tr>
<td>– Can’t check shot until film is processed</td>
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Clinical cameras are typically consumer or professional quality products that have been assembled and/or modified by a reseller who specializes in macrophotography, which allows you to take close-up images of teeth with good resolution and proper illumination. These modifications can simply mean the reseller merely puts a package together that includes a body, lens, and flash or the reseller can actually design proprietary equipment (usually the flash attachment).

However, while proprietary and/or matched systems were deemed to be essential for film-based cameras, the digital revolution is even changing that aspect of clinical photography. Depending on how you choose to display and use digital images, you may not even need the traditional components of clinical cameras. Nevertheless, the right camera can make dental photography a less treacherous discipline and should provide many years of reliable service.

Body

Film

Doesn’t really play a major role in the quality of your photos. It holds, advances, and rewinds the film, but that’s just about it. Almost any body that fits your lens and flash will work, but convenience features such as automatic film loading, automatic film advance, automatic rewind, and other automatic features make your life easier and are nice to have. A databack will also automatically record the date and time of each photo.

Digital

Digital camera bodies run the gamut, from inexpensive, autofocus, point-and-shoot to so-called midrange “prosumer” to full-blown professional SLR models. (Prosumer, a term that combines professional and consumer, describes an individual who is an amateur in a particular field, but who is knowledgeable enough to require equipment with some professional features.) Most dentists, therefore, would fall into the prosumer category when it comes to clinical photography.

Digital cameras are usually compared by their megapixel rating, similar to a car’s horsepower. But what is a megapixel? It starts with pixel, which is short for picture element and is basically a single point in a graphic image. Megapixel, then, is one million pixels. The more megapixels at which a camera is rated, the higher is its presumed resolution, which is the sharpness and clarity of an image. However, just like the car with the highest horsepower may not be the fastest, the megapixel rating of a digital camera may not always be proportional to its resolution. Other factors, such as sensor design, optics, and image processing may be just as important.

Point-and-shoot

Simple, small, and easy to operate. May have a motorized zoom lens. The image is typically viewed on the LCD on the back of the camera and the shot is taken when it is framed properly on the LCD. Can be purchased virtually anywhere that cameras are sold. This type could be adequate for you if your goal is to merely take before and after images of smiles you have created, display them on computer monitors, print small hard copies to give to patients, and you don’t intend to blow up these images poster-size. Prices can be as low as $99.00 for a 3.2 megapixel camera in this category.

Prosumer

Larger and usually higher megapixel rating compared to point-and-shoot. May even accept interchangeable lens. This is type that a reseller would typically modify for clinical use by adding some type of flash attachment that mounts at the end of the lens. The image is typically viewed on the LCD on the back of the camera and the shot is taken when it is framed properly. Usually purchased in a camera store or through a reseller. This type could be adequate for you unless your goal is to be a major speaker on the lecture circuit and/or a prolific contributor to the dental literature. Prices can be as low as $530.00 for a 5 megapixel camera with full lens interchangeability in this category.

Professional

Full-blown SLR models. Works essentially the same as a film-based camera, since you frame the shot through the viewfinder. Allows you to use interchangeable lens and different flashes. Usually purchased through a reseller or a camera store with expertise in macrophotography. This type will satisfy all your needs and goals, but they are big, heavy, and expensive. However, prices have been dropping quickly, with an 8 megapixel camera in this category costing only $997.00 (not including macro lens and accessory flash).

- **Macro Lens** Very important. The best ones are in the 100–120mm range, which will provide an image with the highest accuracy and least distortion. This provides a longer working distance and shorter focal length. The lens should also provide a minimum range of magnification choices of 1:1 to 1:10 and have these magnification levels clearly marked directly on the lens to avoid any guesswork.

- **Flash** Probably the most critical component is the flash. If your photo does not have the proper amount of light, it really does not matter how optically perfect your lens is. The flash in most dental systems is either a ring or point mounted on the end of the lens. However, some of the newer units have a ring that can be partially masked to mimic a point when necessary.

  **Point** Offers more natural lighting with increased shadows and more depth and contrast. For example, full-face photos look better when taken with a point flash. You typically rotate the point flash to different positions around the lens for each specific shot to give the best lighting. Also minimizes or eliminates “red-eye”.

  **Ring** Encircles the lens barrel, which results in a more even distribution of light. This usually gives fewer shadows but less depth and contrast. The ring light usually gives more detail in close-up views. Much more likely, however, to cause “red-eye”.

Retractors

Plastic or Metal

Plastic is favored over metal since there is minimal reflection off plastic retractors. Make sure you can autoclave the retractors before purchasing them.
Self-Retracting or Manual

The self-retracting types are one-piece and, once in position, need no involvement of the patient or the photographer. However, they do not allow any customization of the shot. For example, you may just want to retract the right side. Handheld, manual retractors are much more versatile.

Manual retractors can be controlled by another staff member assisting in the photography or by the patient. The advantage of having the patient assist is that he or she feels a part of the procedure and is very eager to help. Note that whenever lips are retracted, you want to get as much retraction as you can without hurting the patient. When the patient does the retraction, he or she will stop before it becomes painful.

Mirrors

Necessary for occlusal and certain lateral shots. They come in full arch and quadrant sizes and many different shapes.

Backgrounds

**Extraoral** Helps to make full face and certain other shots more attractive. It can be something as simple as a posterboard in any color you prefer positioned behind the patient’s head during the shots. Remember: Unless you are planning to become a professional photographer, you don’t need to set up a studio to take these photos. Very acceptable photographs can be achieved without an elaborate setting.

**Intraoral** Black intraoral backgrounds can certainly make 1:1 shots more dramatic. These can range from a polypropylene sheet that can be easily sectioned for customization or Contrasters, a rigid black anodized aluminum plate with a contiguous handle (looks like flat spatula) from PhotoMed. See MISCELLANEOUS for the report on this product.

### Choosing the Camera That’s Best for You

As mentioned previously, digital technology has changed the landscape of clinical photography. Digital cameras already outsell film-based models and, with prices plummeting, this trend will definitely continue unabated. Even if you don’t have a macro lens or specialized flash, the ability to quickly crop, enlarge, lighten, darken, etc. using off-the-shelf, inexpensive software can level the playing field when it comes to the differences between the classes of cameras. While it is difficult to debate the merits of a top-flight professional system, here are examples of what can be achieved even with inexpensive point-and-shoot cameras.

<table>
<thead>
<tr>
<th>Product</th>
<th>Megapixels</th>
<th>Cost</th>
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<tbody>
<tr>
<td>FinePix S2 Pro</td>
<td>12.1</td>
<td>$3,995.00</td>
</tr>
<tr>
<td>Olympus</td>
<td>5.2</td>
<td>$459.00-$699.95</td>
</tr>
<tr>
<td>Cybershot DSC-T1</td>
<td>5.1</td>
<td>$484.00-$530.00</td>
</tr>
<tr>
<td>PhotoPC 3100z</td>
<td>3.3</td>
<td>$120.00-$530.00</td>
</tr>
<tr>
<td>Exilim EX-Z3</td>
<td>3.2</td>
<td>$205.00-$399.99</td>
</tr>
<tr>
<td>ViviCam 3615</td>
<td>2.1</td>
<td>$79.99-$179.99</td>
</tr>
</tbody>
</table>

Photographer

Clinical cameras should be easy to use by different personnel in the office. The more automatic they are, the better off we are. After all, most of us have no yearning to be professional photographers. For hints on taking clinical photos, please see *The Techniques, Vol 1* (separate edition).
Full Face

Unretracted Smile

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The Ratings
Cameras

1:1, Black Background

Fuji  Olympus  Sony
Epson  Casio  Vivitar

1:1, Retracted In Occlusion

Fuji  Olympus  Sony
Epson  Casio  Vivitar
With these types of results possible, even with inexpensive cameras, it’s difficult to justify paying the price of the following camera, which is the only assembled digital system we have actually tested. Nevertheless, if you just prefer to buy a ready-to-use system and don’t mind paying the premium, the listed system will definitely fit the bill.

The film-based cameras are listed merely as a comparison to the digital system. Even though they perform their role admirably, we are hard pressed to recommend their purchase unless their price is discounted substantially.
### Description
Second generation digital SLR system that includes a TTL dual point ring-like flash. Weighs 4.1lbs/1.9kg. Its resolution captures up to 12.1 megapixel resolution images and can achieve a professional quality image file 4,256 x 2,848 pixels. The set-up and learning time for clinical use of such a sophisticated camera is not quite as fast as a film-based system, but you could learn the basics in about one hour. We found the PhotoMed Quick Start Guide (only three pages) to be a great help in this task.

While the standard memory card is only 64MB, you can also use other cards with more memory. Since high resolution images are the standard if you want to make prints, we advise capturing your images in that mode. You can always lower the resolution of an image to reduce its file size, for example, for a PowerPoint presentation, but you cannot do the reverse.

### RAVES & RANTS
- Rivals resolution of film
- Ability to capture true color of teeth unmatched
- Very expensive
- Larger and heavier than film-based cameras

### Cost: $3,395.00
Includes:
- FinePix S2 Pro Camera body
- Nikon SB-29 Flash
- 105mm Sigma EX Macro lens
- USB memory card reader
- 64MB memory card
- Hard case

### FinePix S2 Pro
Fujifilm (System assembled and marketed by Photomed)
(4.6)

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### TTL Ring and Point System
Nikon or Pentax
(Systems assembled and marketed by Photomed)

#### Nikon N80QD System
Cost: $1,299.00

#### Pentax ZX50 System
Cost: $999.00

### Description
Combination ring and point flash system, available with either the Pentax or Nikon camera body. Both systems weigh about 3.75lbs/1.7kg. The set-up time is minimal (about 10 minutes) primarily because the flash is already attached to either camera. The minimal preparation that is necessary for either camera is explained in very simple language in the Instruction Manual that is provided by PhotoMed. The various buttons and switches on the camera, although somewhat intimidating in appearance, are explained in a language that even a novice can understand.

Both cameras feature auto film loading, auto advance and rewind, a number of recreational exposure modes, and built-in databack. The advantage of the TTL (through-the-lens) flash is that once you have made your initial settings, the camera does just about everything else. However, you still have to focus, set the “F” stop, and select the point or ring flash using the toggle switch on the flash. The magnification guide on the lens is user friendly and highlights, in vivid color, the most commonly used settings. The Nikon also gives you an Electronic Grid-Screen, which appears in the viewfinder to help frame your subject.

### RAVES & RANTS
- Least expensive
- Takes very good photos with point flash
- Ring flash settings produced dark photos
- Not as automatic as Dental Eye III

### Film

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### Nikon N80QD System
Cost: $1,299.00

### Pentax ZX50 System
Cost: $999.00

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**Description**

Sleekest camera on the market and the easiest to use. It integrates the camera body, 100mm macro lens, ring flash, winder, battery pack, standard tripod mount, and databack into a single black cordless design. Weighs slightly more than 3.0lb/1.4kg without the portrait flash, about 3.5lb/1.6kg with the portrait flash. Offers automatic film loading, winding, and rewind. You merely load the film in the system and the camera does the rest. The magnification ranges are 1:1 to 1:15. The databack is included in the standard package and offers the option of imprinting the year/month/day or hour/minute in the lower right corner of the film. This system comes with a black vinyl-coated, aluminum carrying case and no assembly is necessary.

**Cost:** $1,399.00  
**Includes:**  
- Ring Flash  
- 100mm macro lens  
- Databack  
- Grid Image Viewfinder  
- Camera case  

**Options:**  
- $149.00 2x lens  
- $79.00 AC adapter  
- $79.00 Portrait Flash

**RAVES & RANTS**

- Absolutely no adjustments  
- Cool looking  
- Red eye on full faces without portrait flash  
- With only ring light, all photos look flat and have yellow cast

Fortunately, the Dental Eye III is a better camera than its predecessor, taking above average photos. All of the intraoral views are very good, from 1:3 to 1:1. Even the occlusal shots are better than average. And, with the optional portrait flash, which is basically a point flash that mounts on the top of the camera body, even full face shots can be done without the annoying “red eye”. However, these shots are slightly over-exposed.

Other features include the Grid Image Viewfinder, which helps frame your shots and the 2x auxiliary lens, which merely screws into the existing lens on the camera to give you the ultimate close-up shots. However, these shots are difficult to get since the focal length is very tight.

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**REALITY**

**DIGITAL**

The FinePix S2 Pro remains at the top of its class, even though there are now many excellent digital SLRs on the market. Indeed, Fujifilm is getting ready or may have already released the S3 by the time you read this report. However, just like the jump from the S1 to the S2 only brought minor refinements, we can’t imagine that the S3 will offer significant benefits for clinical photography over that which the S2 already fulfills. Probably the biggest advantage you may have with the impending release of the S3 is being to buy the S2 at closeout prices, while being content in knowing that it should fulfill all your needs for clinical photography.

**FILM**

Using the Nikon body and the suggested settings on the lens, the TTL Ring and Point System can take excellent photos with the point flash, but the ring flash will give you dark images. To overcome this problem, you should take the photos one f-stop lower than suggested. Nikon rates slightly higher than the Pentax due to Nikon’s Electronic Grid-Screen, which can help in framing your shots. But the extra $300 seems to be a hefty premium unless you plan to use the photos in lectures or publishing, where the extra precision may be helpful.

If ease of use is your highest priority, buy the Yashica Dental Eye III. However, all of its test photos tended to exhibit a yellow hue to them, were slightly overexposed, and did not have quite the clarity of the other film-based system. Nevertheless, it is the camera of choice if you just want to open the case and start shooting photos. We recommend buying the optional portrait flash, but the 2:1 extreme close-up lens attachment has no real value for general dental photography and is difficult to use in any event.
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