

Ask the Experts

DIGITAL PHOTOGRAPHY

Guest Expert James R. Clark, DMD, MS*

QUESTION: Has the quality of digital clinical photography reached that of 35 mm film?

ANSWER: Over the past few years, digital photography has been slowly replacing film as the medium of choice in the dental office. Digital clinical photography is an excellent way to communicate with patients, insurance providers, and our peers. With a digital camera, a computer, and e-mail access, communication with a referring dentist or specialist is just a mouse click away.

Many articles have been published addressing the issue of digital versus film photography. Because we are comparing two different technologies, it is impossible to say at exactly what resolution a digital camera surpasses or even approaches the resolution of film.

Image sensors in current digital cameras have up to 14 million lightsensitive diodes called photosites. Each photosite relates to one pixel (picture element) of image resolution. Each pixel uses 36 to 48 bits of data to describe color or grayscale. A 14-megapixel camera with a 36-bit

sensor has a digital file size of 504 million bits, or 63 megabytes. This is a finite number to which we can relate. In contrast, a piece of film has no specific number of silver halide crystals, although film with a lower ISO number has more and smaller crystals and therefore produces sharper images with a better tonal range than does film with a higher ISO number. When we compare film to digital images, we must first decide which film to compare. As most digital cameras have ISO settings, do we pick a film that matches our camera? Do we pick slide or print film? Should we bother looking at black and white film? These are valid questions when comparing films to each other, but we are comparing film to digital processing.

What if we photograph a standardized test grid with digital and film cameras and compare the results? The problem now is how to view these images. We can shoot a 35 mm slide and project it, but how do we project the digital image? We certainly cannot use one of today's liquid-crystal display (LCD) or digital light processing (DLP) projectors. The number of pixels projected by a digital projector pales in comparison to a 35 mm slide projector. An XGA (1024×768) digital projector uses only 776,432 pixels. If we scan the 35 mm film, how can we be sure that our scan is capturing all the image information on that frame of film? We can print a film negative with an enlarger, but we must print a digital image with an inkjet, laser, or die-sublimation printer—just another variable with which to contend.

The conclusion reached by the majority of photographers and photography companies, including Eastman Kodak, is that 6 to 10 megapixels of digital resolution gives you all the information that consumer-grade film has to offer. Higher-quality films such as Kodak Kodachrome and Fuji Velvia will, of course, have higher resolution.

For the professional photographer shooting wildlife in Africa, nature in

the Yosemite Valley, or commercial images in New York City, film will always have a place. But for clinical dental photography, digital images work every bit as well as film. Remember, most of us are not making 30×40 or even 8×10 prints but, rather, smaller images for the chart or patient. We show our intraoral images to the patient in the operatory or consultation room using the latest in flat-panel technology, which still has a long way to go before it matches camera resolution. And, projectors used for PowerPoint® (Microsoft, Redmond, WA, USA) presentations are incapable of displaying all the

information that even an inexpensive digital camera delivers.

The advantages of digital clinical photography far outweigh the few disadvantages. With the excellent single-lens reflex digital camera bodies from Canon (Canon USA, Lake Success, NY, USA), Fuji (Fuji Photo Film USA, Hanover Park, IL, USA), and Nikon (Nikon USA, Melville, NY, USA) fitted with sharp 100 or 105 mm macro lenses equipped with point light or ring flash systems, we have cameras that adapt to clinical photography seamlessly. The right software can help you integrate this wonderful technology into your practice. The question should not be "Has digital quality reached that of film?" but "Isn't it time I made the switch?"

SUGGESTED READING

Clark RN. Web page. http://www. clarkvision.com/imagedetail/index.html.

Eastman Kodak. Professional photography Web page. http://www.kodak.com/ global/en/professional/features/ featuresIndex.jhtml.

McClelland D, Eismann K. Digital photography: industrial-strength techniques. Berkeley, CA: Peachpit Press, 1999.

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Editor's Note: If you have a question on any aspect of esthetic dentistry, please direct it to the associate editor, Edward J. Swift Jr, DMD, MS. We will forward questions to appropriate experts and print the answers in this regular feature.

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