

Important clinical uses for digital photography

I remember well the dental clinical photography of the past, when making a clinical photograph required significant expertise and effort, and the results were unknown for days to weeks after making the image. Fortunately, those days are past. Digital technology has revolutionized clinical dental photography. Today's pictures, instead of requiring days' or weeks' time to be developed, are available in seconds and can be displayed on computer screens or large projection screens within minutes. Images can be rotated, enhanced, lightened, darkened, cropped or altered in almost any way a photographer would wish. For a typical dental practitioner with minimal photographic expertise, the new digital photographic technology is one of the most significant potential improvements available for a dental practice.

After many years of involvement with conventional dental photography, I will share my views on how digital photog-

raphy can assist dental practitioners.

CHOOSING THE PHOTOGRAPHER

The number of staff members in dental offices differs enormously. Some dentists work with one or a few staff members, while others have many employees. Unless the dentist likes to be in charge of the photography for the practice, I suggest that the responsibility of making the photographs be delegated to a competent staff person.¹ The dentist and the staff member should decide what images they want to make, and these images should be standardized in size and exposure. The staff person in charge should have responsibility for making the image, storing it in the computer and backing the images up frequently.

DOCUMENTING TREATMENT

Digital photography has greatly increased the ease of documenting treatment, which can

be significant in not only a clinical sense but also a legal sense. The number of dental practitioners involved with legal activity each year is astounding, and it does not appear to be decreasing. A malpractice attorney in Salt Lake City observed to me last year that many dentists in the United States were involved in lawsuits concerning oral therapy (David Epperson, Esq., oral communication, Nov. 1, 2004).

Digital cameras are easy to use, in terms of both making and storing the photographic images. There is no reason to avoid recording potentially legally threatening clinical situations and storing them in digital form for documentation needs. Having served as a witness in numerous dental trials, I can affirm that when photographic documentation of the specific clinical situation under question is available, the dentist's case is much easier to defend.

Busy dentists accomplish

hundreds of procedures per week. Which procedures should be documented? Each practitioner has to make his or her own decision. In my opinion, potentially legally threatening situations should be documented. Examples are implant surgery or placement of several esthetically pleasing, but relatively weak, all-ceramic crowns. At least the starting and ending conditions in such procedures should be documented, as well as any peculiar occurrences during treatment. This documentation requires only minutes and can be assigned to a competent staff member.

I suggest making documentation images of any treatment that is planned as an esthetic upgrade. If the patient complains that the treatment result is not as expected, the preoperative and postoperative images can be useful in demonstrating to the patient the positive change, thereby dispelling allegations that improvements were not made. These images certainly are valuable if legal activity is initiated by the patient.

Any comprehensive or expensive dentistry should be documented. This includes several crowns, complex fixed or implant prostheses, or major periodontal or maxillofacial surgery.

Photographs should be made of patients who appear to be suspicious or overly anxious about the treatment they have agreed to receive, or who have had previous legal activity with a dentist. Unfortunately, this is a growing group of patients, probably because of the vast amount of dental information available on the Internet and in lay publications, and because of the high expectations promoted

by television “makeover” programs. These often are the patients who decide that something is wrong after treatment and seek legal counsel.

Case-documentation photographs should be dated and filed in a manner that makes them retrievable easily. In comparison with word-processed documents, photographic images consume significant space in a computer. Some practitioners have practice management computer systems that facilitate image storage in each patient’s standard dental file. Others who do not have such systems can file photos in a simple alphabetical computer file. Small, easily used computer information storage systems can be purchased to augment storage in office computer systems, allowing storage of enormous numbers of images in a space about the size of a deck of cards. I have used such small information storage systems to back up photos in the event of an office fire, flood, earthquake, burglary or other problem. The small back-up file should not be kept in the same environment as the main storage area, and it should be backed up frequently.

Another significant reason for making documentary treatment images is to verify the treatment rendered to third-party payment companies. I know of several recent situations in which sending a dental benefit company a digital image of the treatment carried out has prevented a confrontation about the treatment. Such images easily can be sent by e-mail in seconds.

PATIENT EDUCATION

The following example shows the desirability of having a library of clinical images for patient education. Let’s assume

a patient has a missing maxillary lateral incisor. You can labor through the various treatments verbally, with minimal patient understanding, or you can turn on your computer and show the patient the alternative treatments. As an example, there are several treatment alternatives for one missing maxillary lateral incisor, including

- a cantilever fixed partial denture abutting the canine;
- a three-unit fixed partial denture extending from the canine to the central incisor;
- a removable partial denture with a metal substructure;
- an all-polymer removable partial denture;
- an implant-supported crown;
- an acid-etched, resin cement-retained, ceramic, resin-based composite or porcelain-fused-to-metal fixed partial denture;
- nothing.

Significant time is required to secure informed consent from the patient for all of these treatment options.^{2,3} With adequate preparation, a practitioner easily can show treatment alternatives based on previous treatment accomplished with other patients. When the patient sees the various alternatives and receives adequate oral or written information to satisfy informed consent requirements, the decision about which treatment to select is faster and easier.

Another example I use routinely is education regarding treatment for the edentulous mandible.⁴ Patients with this condition can be treated with a typical mandibular denture, with two implants and an overdenture, or with several implants supporting a fixed or

removable implant prosthesis. Patients who see the images of the alternatives are able to understand the concepts rapidly and easily, and their acceptance of treatment is facilitated. Practitioners quickly can build a library of slides covering the procedures they accomplish most commonly.

I suggest making a list of the most-used procedures in your practice, developing a library of images of those procedures as rapidly as possible, and filing the images in a computer for patient-education purposes.⁵ Create a library of educational images that can be filed by subject matter, unlike the customary method of filing images of specific patients in the individual patient files.

CLINICAL RESEARCH

A sadly neglected area of potential practitioner-generated research knowledge is computer storage of images of treatment accomplished, the date of treatment and any peculiar information that may relate to the functional longevity or the long-term esthetic acceptability of the treatment. It is easy to visualize the potential research information that could be generated if many dentists collected thousands of digital images of a restorative procedure, a periodontal treatment or an orthodontic procedure, and those images then were evaluated in a controlled manner by a clinical researcher. Such a possibility is not likely to happen soon, but each practitioner can collect images from his or her own practice to guide in selection of materials, devices and techniques for personal use. Collection of the images is easy and

fast. However, time must be scheduled to categorize them and place them in a computer. In my opinion, the time thus expended is well offset by the many advantages that arise from this activity.

DIGITAL CAMERAS

It has been my observation from teaching continuing education courses that most dentists in attendance own digital cameras but do not use them for clinical purposes. Some dentists still need to purchase a digital camera, and it is slightly discouraging that most digital cameras on the market now will be adequate for only a few years, because of the rapid development in this area. Nevertheless, I strongly advise dentists to purchase clinical digital cameras and learn how to use them as soon as possible. There are many digital cameras on the market that can be adapted to dental use.⁶

The cost of an adequate dental digital camera ranges from \$1,300 to \$2,000. Some examples of easy-to-use dental digital cameras are the Canon PowerShot A95 (Canon U.S.A., Lake Success, N.Y.), which is packaged for dental use in a kit called DentalFoto 95 by Dental Learning Centers (Issaquah, Wash.), and the Kodak DX6490 Dental Digital Camera System (Eastman Kodak, Rochester, N.Y.).

Most digital photography authorities agree that making dental images at a level of about 3 million megapixels probably is adequate, and I agree with that. However, you may increase the detail in the images by setting some of the cameras at a higher resolution. The challenge of

higher resolution is the computer space necessary to store the images. The higher the image's resolution, the more computer storage space it requires.

SUMMARY

Digital photography almost has overtaken the conventional photographic film industry. Most professional photographers are using either digital photography alone or a combination of digital and conventional film photography. The trend toward digital photography is not likely to change. Using digital photography in the dental office is fast, easy and highly useful for documenting treatment, carrying out patient education and accomplishing clinical research. Supervision and use of this new technology can be delegated to staff members, and it will provide many benefits to dentists and patients. ■

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The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the American Dental Association.

Educational information on topics discussed by Dr. Christensen in this article is available through Practical Clinical Courses and can be obtained by calling 1-800-223-6569.

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