Clinical digital photography is probably the most important tool for communication in the dental office. Digital photography allows the dental team to educate the patient without having to hold a mirror and try to explain what is being changed or enhanced. [QA. Deleted this sentence because it didn’t quite flow with the rest of the paragraph. Edit okay?] Digital photography should be fun and exciting. Everything from patient education to laboratory communication can happen with the click of a button. Excellent photography will take patients’ records to a whole new level.

Slide Cameras and Film
Before digital cameras, every dental practice I worked in used the Lester Dine slide camera and slide film (Kodak Ectachrome 100, Kodak Dental Systems). The processing fees could cost as much as $60,000 for 1 year. The practice also used intraoral cameras for new patient consultation, which allowed for storing pictures in the patient’s file. However, these pictures were stored in different places and the team would have to go in and out of the patient’s charts to find them. [QA. Add a few sentences describing the benefits, including cost, and ease of using a digital camera and equipment.]

Types of Digital Cameras
Choosing the right digital camera depends on what the practice is trying to achieve. The three most popular cameras on the market today are the Canon 20D (Canon USA, Inc), Fuji S2 (Fuji Film), and Kodak Easy Share (Kodak Dental Systems). Every team must decide what works for the office and what will be done with these pictures. In our dental office, we use the Canon 20D. [QA. Why?] Canon now has the 30D, which gives you a 2.5-in display on the back of the camera. [QA. You mention three cameras and then mention that each practice must decide for itself which to use depending on what works for them and what they’re trying to do. Describe different features of these cameras and why one might be better for certain things. Give me detail about these cameras.]

Camera Cards
One of the most important things to remember is to never have only one camera card in the office. If something happens to the card, there should be a backup. Andy Thompson from Norman Camera Company [QA. Who is Andy?] recommends that for every camera there should be at least two cards (Figure 1). In our dental office, each team member who uses the camera has his/her own card. This allows each team member to be responsible for downloading their own pictures. If the pictures on a card are accidentally deleted, do not take any more pictures. Norman Camera Company has software that can retrieve the pictures for you. [QA. What’s the name of the software? Can it be bought for a dental practice? Is Norman Camera Company the only place that have this software or do other places have it too? Need more information.]

Tray Setup for Photography

Figure 1—For every camera, there should be at least two camera cards.
Figure 2—Black background paddle.
Figure 3—Full-face portrait photography is framed horizontally.
In our office, there are specific setups for different dental procedures, including taking pictures. The tray setup for taking pictures consists of the following:
- Retractors: plastic and metal
- Mirrors: buccal and occlusal mirrors with handles
- Black background paddle (Figure 2)

Trying different retractors and mirrors will allow you to decide what works best in your office.

Background

When taking portrait photographs, choosing the background color is very important. Neutral, light backgrounds are best. Blue, gray, and beige are recommended. These backgrounds can be purchased from Norman Camera Company [QA. And where else?] or you can make your own. Gluing or taping some photography paper to a piece of 2-in x 3-in foam board creates a background that can be held by another team member. This board can also be placed behind the patient sitting upright in the chair. If your office has the space, you can also use a shade that can be easily pulled down when portraits are being taken. [QA. Are backgrounds used in the mouth too or just in portrait photographs?]

Selecting the Proper F-stops

The f-stop must be set before taking the picture. When the f-stop is higher, the aperture is closed more, which restricts light from entering and hitting the computer chip in the camera. Always use the highest f-stop possible to capture the greatest depth-of-field. Depth-of-field refers to how much of the image is in focus. Portraits will be exposed to f-stops at 5.6 to 6.3 because the patient is far away from the camera and the light source, and high levels of light need to enter the camera for a clear image. When taking intraoral photographs, the f-stop should be at 22 to 32 because the camera and the light source are close to the subject and less light is needed to make a clear image.

Recognizing Patients

When patients come in for a new patient consult, we interview them and take digital pictures to communicate what treatment the patient may or may not need. This also allows the team to remember who the patient is if treatment has to be delayed or in case that patient only comes back months or a year after the initial consult. In our practice, these are placed on the first page inside the patient’s chart so when the chart is pulled, we can immediately see the patient. Our office takes four frames: full face, retracted smile, and retracted mirror shots for the maxillary and mandibular arches.

AADC Format

In our office, the standard AADC (American Academy of Cosmetic Dentistry)—accredited photographs are used to be consistent. [QA. Please explain exactly what this standard consists of.] The whole team should be trained to take photographs the same way, and this standard format makes it easy to be consistent. This photograph guide was designed and produced specifically to give the dentist guidance related to photographic requirements for the AADC accreditation review presentation. There are 24 slides for the required views; 12 before images and 12 after images are required. All photographs being submitted for accreditation must be in RAW format; otherwise, always shoot in JPEG to conserve hard-drive space. The AADC format is listed in the Table.

Full-face Portrait Photography

This shot is framed horizontally (Figure 3). The full-face view should show the top of the head to just below the chin. The nose should be in the center of the portrait, so the head should be in the center of the frame. The patient should be instructed to stand up straight. Some patients like to tuck their chin down. In that case, place your hand under the patient’s chin and ask him/her to stick out his/her chin. If the patient blinks in the flash, have him/her turn the head and count, looking ahead on three. [QA. Do you snap the picture on three?] This takes their mind off the picture taking. Some patients have difficulty smiling or have an acquired smile as a result of low self-confidence or low self-esteem. Some common errors are head tilting or the head not being in the center of the frame. The camera can also be too high or low in relation to the patient.

Full-smile: Frontal View 1:2

The central incisors are the focus of the full-smile, frontal view (Figure 4). This view should include the corners of the smile. The patient should exhibit a full, natural smile. The nose and chin should not be in the frame. The smile should show an equal amount of skin above and below the lips. The camera should be at the same level as the patient. Encourage the patient to give an exaggerated smile. [QA. Why?] Make sure there is no evidence of saliva, food, lipstick, impression material, plaque, or distracting debris in the picture.

Full-smile: Right and Left Lateral Views 1:2

The lateral smile view is made with the lateral incisor as the focus point and center of the image (Figures 5 and 6). The frame of the picture should include the upper and lower lips and equal amounts of skin above and below the lips. The camera should be at the same level
as the patient. The relationship of the anterior teeth to the lower lip is important in this view. Avoid taking the view like a profile.

Upper and Lower Teeth: Frontal View 1:2

The upper and lower teeth should be slightly parted so that all incisal edges show (Figure 7). The retractors should be minimally visible and the lips should not be in the frame. The maxillary central incisors are the focal point of the image. The camera lens should be parallel to the plane of occlusion to avoid creating the appearance of occlusal place discrepancies that may not be present. Avoid tilting or not centering the frame. Make sure that the camera is not too low or too high in relation to the face.

Upper and Lower Teeth: Right and Left Lateral View 1:2

The upper and lower teeth should be slightly parted so the incisal edges are visible (Figures 8 and 9). The retractors should be minimally visible and the lips should not be in the frame. The frame of the picture should include the upper and lower lips and equal amounts of skin above and below the lips. The camera should be at the same level as the patient. The relationship of the anterior teeth to the lower lip is important in this view. Avoid taking the view like a profile.

Treated Teeth Including Incisors (Upper or Lower): Frontal View 1:1

The upper or lower central incisors (whichever arch is treated) should be centered in this view. There should be no lip or cheek tissue or retractors visible in the image. The opposing teeth should not be visible in the frame. Be careful that the camera angle is not too low or too high.

Treated Teeth Including Incisors (Right and Left): Lateral View 1:1

The right or left lateral incisor (whichever arch is being treated) of the upper or lower teeth should be centered in this frame (Figures 10 and 11). There should be no lip or cheek tissue or retractors visible in the image. The opposing teeth should not be visible in the frame. Be careful that the camera angle is not too low or too high.

Upper Arch: Occlusal View 1:2

The upper-arch occlusal view is always taken as a reflected view using a high-quality mirror (Figure 12). There should be no lip or cheek tissue or retractors visible in the image. The distal of the second molars should be in the frame. You should not see any lower teeth in the picture. By using a mirror that has a handle, gloves and fingers will not be seen on the edges of the mirror. Ask the patient to lift the head, with the chin up. This allows the tongue to
relax. The mirror should be placed a little further back for those last molar shots. To keep the mirror from fogging up, run it under hot water. Air across the mirror may be needed. Avoid the facial surface being cut off in the frame. Keep the patient’s nose out of the frame.

**Lower Arch: Occlusal View 1:2**

The occlusal view is always taken as a reflected view using a high-quality mirror (Figure 13). The lips and cheeks should be retracted enough to show all the gingiva in the arch. The distal of the second molars should be in the frame. The mirror should not rest on the lower posteriors; it allows an image of the upper posterior to be in the frame. By using a mirror that has a handle, gloves and fingers will not be seen on the edges. Ask the patient to lift the head, with the chin up. This allows the tongue to relax. The mirror can be placed a little further back for those last molar shots. To keep the mirror from fogging up, run it under hot water. Air across the mirror may be needed. Avoid the facial surface being cut off in the frame. Keep the patient’s nose out of the frame.

**Conclusion**

Digital photography is crucial not only for the esthetic dental office but also for the office reaching for that next level of care. It can be a part of the everyday routine. [QA. Add a few more sen-

**Acknowledgment**

The author would like to thank Andy Thompson for all his help through the years, even when pictures were lost and cameras were broken.