Editor's note: Dr. Ed Lowe demonstrates in a chairside setting the 12 AACD Accredited photographic views, and valuable tips on how to take them quickly and efficiently, in an AACD online CE course at www.aacd.com, which complements this article.

**INTRODUCTION**

“A picture is worth a thousand words.” How often have we heard this cliché? One of the most rewarding things we can do as a cosmetic dentist is to change a person’s life by taking their smile from ordinary (or worse) to spectacular. But it is a shame that beautiful clinical outcomes often are not accurately represented in journals, ads, and on Web sites by photographs that do not do justice to the dentistry.

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We are exceptionally fortunate that digital photographic equipment has evolved to the level we see today. The ability to capture numerous images on a high-capacity flash memory card and the ability to immediately review the image on the liquid crystal display (LCD) viewer has liberated us from the confines of film and the inconveniences of the photo processing lab. This savings in time alone makes digital photography more affordable and less daunting than film photography. It is fun, and so easy that anyone can learn to obtain great images with just a little training.¹
I am very passionate about photography and I encourage everyone not to be apprehensive about what to do or how good his or her pictures are. I have taken a lot of bad pictures in order to acquire the skill and knowledge to take good ones. This article discusses how to simplify the taking of digital images. Once you have set up your camera for digital dental photography, very few adjustments are necessary to take all of the AACD Accreditation photographs.

I use a camera body that offers through the lens (TTL) viewing. This means that when you look through the viewfinder, what you see is what you will get in the final image. Small point and shoot cameras that are not a digital single lens reflex (SLR) are not considered adequate for this caliber of photography.

**THE CAMERA SYSTEM**

A digital camera with a 100-mm macro lens and removable mounted flash is recommended for best results. This is a long lens and may be cumbersome for some dental assistants to handle; it takes a bit of getting used to. This kind of camera with lens and flash can be purchased at many photography stores or online. You can find a system that offers a camera body, lens, and ring flash for less than $2,000 USD.

Many practitioners choose a ring flash for ease of use (Fig 1). Some are enthusiastic about the twin point flash system. The ring flash exposes the subject to light from every angle, yet it tends to “flatten” details such as facial anatomy in your beautiful porcelain veneers. A twin point flash gives better reproduction of surface detail, but it is a little larger than the ring flash, more expensive, and somewhat more cumbersome to use (Fig 2). It is really a matter of personal preference.

Images of the required AACD Accreditation views are captured at one of three magnification ratios (1:10, 1:2, and 1:1). These magnification ratio numbers are carried over from analog (film) photography, so you must make any necessary conversions to produce photos at a magnification comparable to the images shown in this article and in the AACD’s current Guide to Accreditation Photography.³ Lens magnification conversion is needed for many digital SLR cameras without full frame sensors. Settings will vary with sensor and patient face size. Cameras with smaller sensors will require about a 1.5 times increase in the setting on the lens barrel. The numbers are closer to 1:15 for portraits; 1:3 for smile and retracted views 2 through 7, 11 and 12; and 1:1.5 for the close up retracted views. It is easy, as the ratios are etched or printed on the barrel of the lens (Fig 3).

**OBTAINING OPTIMUM RESULTS**

First, determine the focal length for each required AACD image. Look through the viewfinder at your subject’s smile. As you rotate the lens barrel while looking through the viewfinder, the focus of the image will change. It is easy because there are only three settings to think about. The first is for the portrait.
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photo, the second is for the normal smile and retracted views (1:3) (Fig 4) as well as the occlusal views, and the third is for the close-up retracted views.

Exposure is the process of recording light onto the digital sensor. More specifically, exposure is the amount of light over a specific period of time, as the light strikes the sensor (Fig 5a). The amount (intensity) of light is controlled by the aperture setting (discussed below), and the time is controlled by the shutter speed, measured in fractions of a second. The sensor’s sensitivity is controlled by adjusting the International Organization for Standardization (ISO) number.

These three settings are called the exposure triangle (Fig 5b).

**Camera Settings**

**ISO:** This number can be thought of as film speed. It controls the sensitivity to light of the camera’s capture chip or sensor. The lower the ISO number (e.g., 100 or 200), the less sensitive the chip, the sharper the image, and more light is needed to obtain a good image. Conversely, a higher ISO setting requires less light, but the image obtained can be “noisy” or “grainy”; in other words, less sharp. For dental photography I recommend setting the camera to ISO 200. Many cameras will set the ISO automatically. This is not recommended for dental photography. If you have trouble with your camera’s ISO setting, consult the vendor or the camera manual for instructions on setting the ISO by hand.

**Aperture or f/stop:** This important setting controls the amount (intensity) of light striking the sensor. Aperture settings, also called f/stops,
are numbered from about f/2.8 to f/32 for most single lens reflex (SLR) digital cameras. It actually is an adjustable hole (aperture) in the lens through which the light passes (Fig 6). The f/stop affects depth of field, which is the amount of the subject that is in focus from front to back. The higher the f/stop number, the smaller the hole. A small hole means that less light will reach the sensor, resulting in a sharper image. The lower the f/stop number, the larger the aperture, allowing more light to reach the sensor; images will be less sharp.

**Shutter speed:** This is expressed in fractions of a second. In other words, 1/200 of a second is simply written as 200.

The three settings discussed above are controllable variables. Light intensity is another controllable variable. As you will be shooting the AACD Accreditation views in artificial light rather than in sunlight, the flash can be adjusted to provide greater or less intensity of light, depending on your requirements. For a Canon 5D SLR, the flash is set at evaluative through the lens (ETTL) (Canon USA; Lake Success, NY) metering, with an exposure setting of minus 1/3. This may be different for Nikon and other camera/flash setups.

You may find that you need to experiment a bit to get just the right amount of light for correct exposure, by moving the flash setting up or down.²

**White balance:** This setting adjusts the camera so that colors in the image look natural. You will want to set your camera’s white balance for flash illumination (Fig 7). If your images have a blue, red, or greenish cast, consult the camera’s instruction booklet on how to manually set the white balance.
Camera Settings for the 12 AACD Views

Figure 8 shows the camera settings for the 12 AACD Accreditation views. Note that the numbers 1 through 12 correspond to the 12 AACD Accreditation views seen in the Guide to Accreditation Photography (they are listed out of numerical order here because it is easier to shoot them in this order, as there is less need to change the lens and aperture settings back and forth).

<table>
<thead>
<tr>
<th>View</th>
<th>ISO</th>
<th>Aperture</th>
<th>Shutter Speed</th>
<th>Lens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 portrait</td>
<td>100-200</td>
<td>f/5.6</td>
<td>1/125-1/250</td>
<td>1:10 (1:15)</td>
</tr>
<tr>
<td>2 smile</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>3 smile right</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>4 smile left</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>5 retracted frontal</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>6 retracted right</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>7 retracted left</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>11 upper occlusal</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>12 lower occlusal</td>
<td>100-200</td>
<td>f/18-29</td>
<td>1/125-1/250</td>
<td>1:2 (1:3)</td>
</tr>
<tr>
<td>8 retracted close-up</td>
<td>100-200</td>
<td>f/29-32</td>
<td>1/125-1/250</td>
<td>1:1 (1:1.15)</td>
</tr>
<tr>
<td>9 retracted close-up right</td>
<td>100-200</td>
<td>f/29-32</td>
<td>1/125-1/250</td>
<td>1:1 (1:1.15)</td>
</tr>
<tr>
<td>10 retracted close-up left</td>
<td>100-200</td>
<td>f/29-32</td>
<td>1/125-1/250</td>
<td>1:1 (1:1.15)</td>
</tr>
</tbody>
</table>

Figure 8: Camera settings for the 12 AACD views.

Recommended Camera Settings for the 12 AACD Views

Taking high-quality digital photographs is simple and fun. I want you to get excited about photography and above all else, to take action and begin.

As my colleague Dr. Jim Hastings says, “Photography is the one parameter in Accreditation over which the operator has complete control. Why not make it impeccable!”

Part Two of this article will offer practical tips on how to quickly and efficiently take the 12 standard photographic views required for all Accreditation clinical case submissions.

References