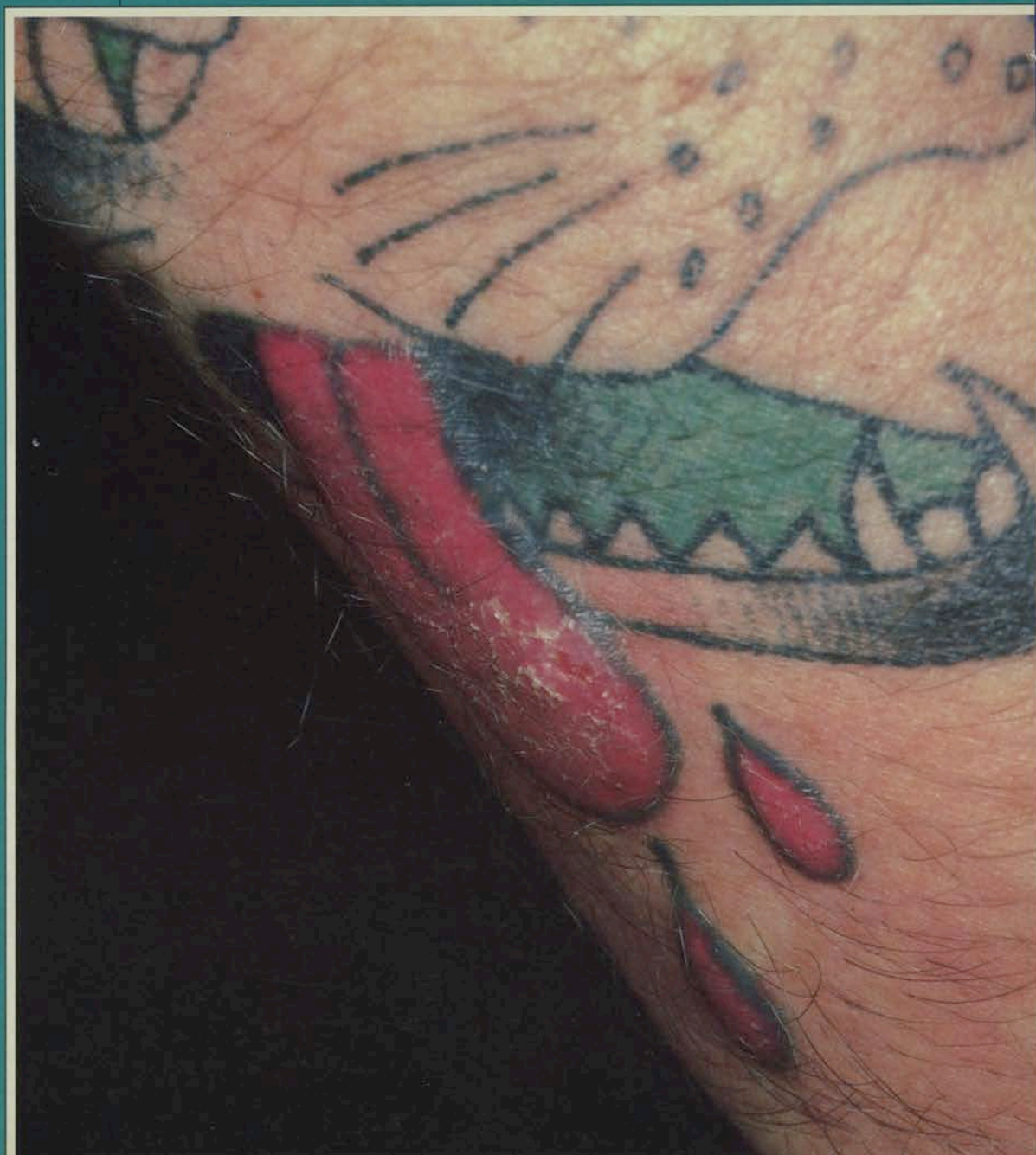


Volume 1 Number 3  
Summer 1990

# MID PHOTO

*Medical  
Photography  
for the  
Dermatologist*



Basal Cell Masquerade

The Farmer's Wife

Choosing a Photographic Film

BULK RATE  
U.S. POSTAGE  
**PAID**  
Permit No. 16  
New Richmond, WI  
54017

# Considerations in Choosing a Photographic Film

Michael R. Peres, RBP

**Y**ou may not be a professional photographer, but as a physician you need to record your work as accurately as possible. Film is an essential part of this recording process. It is one of the least understood aspects of photography and the one most taken for granted. The right film is a must for achieving accurate clinical recordings. A variety of questions should come to mind before purchasing a roll of film. Why do you choose a certain brand? What questions do you ask of the salesperson and what do you know about that product? Do you buy a specific brand because you have always done so— are there better choices to meet your specific needs?

Film is a product that has been sensitized, and film sensitivity is the ability of the material to respond to light. This sensitivity to light is caused by a layer of silver salts that have been spread evenly over a plastic base. Among the many types of film, each reacts to light in different ways. As a result, each film and its emulsion is different with specific characteristics. It is not a valid reason to use a film because that is what you have always used.

Until a few years ago film sensitivity was referred to as its ASA (American Standards Association), but a more contemporary and universally accepted standard has replaced it—ISO (International Standards Organization). The higher the ISO of the film, the greater the sensitivity to light; therefore, it requires a shorter exposure time.

To produce an emulsion that is highly light sensitive, a manufacturer must either add more silver salts of the same size into the film, or make larger silver salts. Similarly, to decrease a film's sensitivity, and therefore increase exposure time, the manufacturer uses less silver salts. Low sensitivity products have film speeds of 25 to 50, moderate sensitivity products range from 50 to 200, and high speed emulsions includes 400 and higher. To obtain the best pictures in an office with fluorescent lights, use an electronic flash. This will help you get better color. In a brightly lit office—an office with lots of window light—a film with an ISO of 200 is fast enough to record the image in most situations. A film speed of 100 may give you some blur, especially if the the photographer is not able to steadily hand hold the camera.

In addition to its light sensitivity, other factors that make each type of film unique include grain, resolution, contrast, latitude, spectral sensitivity, color balance, and professional *v* amateur. When selecting the correct film, inquire about what film characteristics would best serve your photographic needs.

## Grain

A photograph that is grainy (composed of dots) may lose important detail. Grain is a term given to the metallic particles of silver that were formed chemically during development. Be aware that certain films will produce a more grainy picture than others; grain is a total function of the film and is not related to the picture-taking process. A grainy photograph may be good for an artistic expression but should be avoided for medical photography. A high film speed does not have the potential to render a fine-detailed photograph; a slow film will produce a fine grain pattern.

## Resolution

A concept related to speed and grain is the emulsion's resolution. When talking about film resolution, the term sharp is often substituted—for instance "how sharp is a picture?" Sharp is a term that is used, but it is not a measurable quantity because what is sharp for one person may not be equally as sharp for another. A picture's sharpness can not be measured.

Resolution is the ability of a material to resolve lines per millimeter. Generally, the higher the film speed the larger the grain, the lower the resolution of the film. As mentioned earlier, large grain will inhibit fine detail recording because the grain is too large to separate it. For this reason, select the lowest possible film speed because the film will then have a good resolution potential, enabling finer details of irregular texture and color to be recorded. A higher film speed will deliver a sharper picture—only when used with an electronic flash.

## Contrast

Contrast is a measure of the film's ability to separate black from white, hue from hue, or shades of a

Michael R. Peres, RBP  
Chairman and Assistant  
Professor of the Biomedical  
Photographic  
Communications Program  
Rochester Institute of  
Technology  
One Lomb Memorial Drive  
Rochester, NY 14623-0887

certain color. It is a popular misconception that film speed is related to contrast. There is no real correlation of a material's contrast as compared to its sensitivity; thus, it is not possible to say that a fine grain film is more contrasty than a high speed film. Contrast is usually a product of the process of picture making and not the film. The contrast one sees when looking at the final picture is usually produced from the light and/or color contrast of the subject and is not inherent to the film.

The family of color slide films generally are more contrasty than color print films. Transparency emulsions differ ever so slightly from the negative films in resolution. Contrast makes things look sharper even though they may not be. Because slides have more contrast, they will always look sharper than prints. If pictures were taken of the same subject on slide film and negative film and results examined, the slide would look sharper because of slide film's higher contrast. This concept of visual sharpness should be a consideration in choosing a film.

#### Latitude

Latitude is the film's ability to deliver a usable result in an improper exposure situation (either too much or not enough light). When it is difficult to obtain accurate exposures, a film with a wide tolerance is most beneficial. From my experience, a material that can deliver some information in the film with 2 stop exposure error would have a wide latitude. This type of latitude is represented by the color negative family. Kodacolor ISO 100 offers the ability to respond to incorrect exposures and still deliver a usable result. In contrast to slide films where an exposure error of more than 1/2 stop usually results in an image that is quite marginal. The moral of the story is if you want contrast, you will need a film with a tight exposure latitude using color slides.

#### Spectral Sensitivity

Because of subtle color differences in skin conditions, spectral sensitivity is an important aspect of color film. Spectral sensitivity is film's capability to respond to the spectrum. Determining if the emulsion is uniformly sensitive to the spectral components of blue, green, and red when exposed to "white" light is important for accurate color recording. The two general types of films that fall into this category are color print and color slide films.

Shooting patient photography on color print film presents a potential problem with the photofinishing and getting the right color. A dermatologist knows the color of flesh as well as the color of the rash. However, the technician doing the printing has no idea what things looked like, so he may inaccurately interpret the color, which is a major concern for dermatologic photographers who need accurate photos. To ensure accuracy, take a picture of a gray card (an industry standard available in most photo stores) on the first frame of the roll as a standard for

## Film Storage

One way to preserve film, as with any perishable product, is by refrigeration or freezing, which will slow down the deterioration process and thus maintain life expectancy. Whenever you buy film and it is still in the package, keep it in cold storage. This will maintain its speed and color for an extended period of time. Always keep your camera and film out of direct sunlight, and try to avoid exposing your film to radical temperature changes.

If you cold store film, when you take it from refrigeration, you should let it warm up. The film will have some condensation formed on it that could damage the emulsion. Because it has been packaged in a humidity secure plastic vial, if you take the film prematurely from the container, you run the risk of having drops of condensation form on the emulsion and leave marks over your pictures. The warm up time is in the neighborhood of one hour from the time it has been taken from the refrigerator until the time of camera loading.

a reference. This provides a start, but room for interpretation of color is still possible. Color slide films, when used appropriately, are not subject to the problem of color inaccuracy since there is no interpretation during the photofinishing.

#### Color Balance

Color balance describes the predominant light source that works with a certain film. Always try to match your light source with the appropriate film. Daylight balance films (indicated on box) are designed to use 5500K light source, which is equivalent to the sun or an electronic flash. Tungsten balance films (indicated on box) are designed to be used with a light source of 3200K. This would be similar to that of a microscope or an examining-room light. Shooting films with the wrong light source will result in an incorrect color cast on pictures. For example, if you shoot daylight film with tungsten lights, the color cast of the pictures would be yellow.

*Kodachrome and Ektachrome.* The goal of any color slide film is to reproduce the subject's colors as accurately as possible and maintain neutrality. Accurate reproduction doesn't happen all the time. It is the function of film, the light source, and photofinishing. A comparison of the spectral sensitivities and subsequent color renderings of two families of slide films may help with this concept. There are many manufacturers of color slide films but this discussion will focus on Kodak products of Kodachrome and Ektachrome.

Kodachrome is a good film for dermatologic photography because of its fine grain and accurate detail recording; however, it has a tendency to enhance the reds and yellows. Kodachromes traditionally have more sensitivity in this region of the color spectrum and thus will produce a warmer color slide. Keep this in mind if color recording is critical.

The other family of color slide films from Kodak is the Ektachromes. Ektachrome film has more of a range of color reproduction—from a bit cool to

**Accurate reproduction doesn't happen all the time. It is the function of film, the light source, and photofinishing.**

## Instant Film

Polaroid instant material is a viable option when considering a photographic film.

Unlike 35mm film, instant film does not have to be sent out for processing. The convenient 60-second processing time is an important feature when it is necessary to have an immediate record. This can either be print or slide. If you are using prints, pertinent information (eg, patient's name, skin condition) can be written along the picture's border. This picture will serve as a fairly good record—for a period of time. As with any color material, some fading may occur over time and varies based on storage conditions.

Another consideration for using the Polaroid system is the point and shoot type of camera. This is good for the inexperienced operator, since it is simpler than some 35mm camera systems.

Point and shoot systems (Time Zero, Spectra, and SX-70 emulsions) have other characteristics to keep in mind. With respect to these films, the color could be less saturated; however, this could be a function of the camera system/flash and the subject's distance from the camera. The resolution of pictures may be less compared to other films and the neutrality of whites not as pure. It must be mentioned though, as is the potential with any photofinishing, the neutrality of any emulsion can drift if not closely observed. Contrast is usually quite good with the Polaroid system.

Lastly, unlike the storage of other photographic products, do not freeze Polaroid materials. The developer and battery is incorporated into the film; freezing would be detrimental to performance.

neutral—in what color responses they deliver. One of the best emulsions for dermatology photography is Ektachrome 100 because of its excellent neutrality in color rendition, which allows for the recording of flesh tones to be much more accurate. Another popular film for office photography is Ektachrome 64. This emulsion is a bit cool in its recording, making the skin look somewhat blue. Numerous other products will work and record color accurately, but test them first to ascertain how each renders the skin.

Remember that different products require a different type of photofinishing. The Kodachrome films must be sent out to special labs that process K-14. Some establishments that process K-14 are Kodalux or Dynacolor labs. There are others but these labs are not quite as accessible—you may need to do some research to locate one in your area. Depending on where you live, film processing could take two days or two weeks—an issue if turn around time is important. Overall, the consistency of the processing is quite good.

Ektachrome is processed in a sequence known as E-6. E-6 processing is widely available and is usually accomplished in four hours or less. When choosing a lab to process your results, do your homework. Quality work can be reduced to marginal work by the photofinishing. To ensure quality results, look for a quality lab with a good reputation and one that runs control strips as part of their daily operation. The control strips will guarantee that photofinishing is accurately performed.

Like many film characteristics, color saturation is also directly related to film speed. Slower film will deliver higher saturation of colors and faster speed films suffer from lower saturation potentials. Subtle hues of pigments maybe lost when faster speeds are utilized. To maximize irregular characteristics, a higher contrast film of lower speed will deliver the best color saturation. This results in better demarcation of the subtle differences of a condition.

## Professional v Amateur Films

The choice between professional and amateur films is an important consideration. Before revealing the differences in these products, pointing out the similarities will be helpful. Amateur films have the same sharpness, granularity, and sensitivity of their professional counterparts, but they have been manufactured to be used differently. Amateur films have been designed to be purchased in small quantities and stay in the camera for an extended period of time. They have also been designed to age on the shelf or in the camera. These films may start out a bit cool in color, then age to neutral, eventually becoming yellow before reaching their expiration date. While films change color as approaching expiration, they also may suffer a speed change. Amateur film has not been designed for immediate processing.

Professional films on the other hand are sold only when their color is neutral. This neutrality of color is accompanied by a specific sensitivity to light. The product has been tested by the manufacturer and stored when it reaches this desired point. Because of the precision in manufacturing and testing of professional films, this product costs more and comes only in a 36 exposure roll. If quality of color is important and you shoot more than one roll a week, the professional product will work best.

Regardless of whether you are using professional or amateur film, always check the bottom of the box for the film's expiration date and have the photofinishing done by this date. Film is a perishable product and time will change the way it responds. Over time, film may not record colors as accurately and it may not have the same speed to light as when it was manufactured. Also, it may become brittle and break in the camera. Try and keep track of how long your film is left in the camera. After several months, remove the film and replace with a new roll even though the first was not finished.

The advice in this article will assist you in choosing the correct film for your photographic needs. As mentioned, grain, contrast, speed, spectral sensitivity, latitude, and color are all interrelated characteristics that need to be considered when selecting a photographic film.

If you have any questions about photography, please feel free to write to me. Also, for more information call Kodak's technical extension—1-800-242-2424, ext 12. ■

## Comparing KODAK Films for Dermatologic Photography

Film	ISO	Resolution	Grain	Color Saturation	Flesh Tone Reproduction	Light Source to be Used	Processing	Turn Around Time	Other Comments
Kodachrome (slide)	25	very high	very fine	excellent	warm	daylight	K-14	2 d - 2 wk	Too slow, needs very powerful light source
	40	very high	fine	high	not recommended	tungsten	K-14	2 d - 2 wk	Photomicrography film
	64	very high	fine	high	warm	daylight	K-14	2 d - 2 wk	Excellent choice, but may enhance colors
	200	moderate	fine	good	warm	daylight	E-6	1 hr - 1 d	Good choice
Ektachrome (slide)	64	very high	fine	good	cool	daylight	E-6	1 hr - 1 d	Not as neutral as 100, but a good choice
	100	high	fine	good	very neutral	daylight	E-6	1 hr - 1 d	The best transparency film for patient photography
	100 plus	high	fine	good	warm	daylight	E-6	1 hr - 1 d	Similar response as Kodachrome 64
	50	high	fine	excellent	not recommended	tungsten	E-6	1 hr - 1 d	A good film for photomicrography
	160	high	fine	moderate	not recommended	tungsten	E-6	1 hr - 1 d	A good general purpose tungsten film
	200	moderate	fine	moderate	cool	daylight	E-6	1 hr - 1 d	With less powerful flash adequate
	400	moderate	moderate	moderate	cool	daylight	E-6	1 hr - 1 d	Not the best, but useful in low-light situations
Kodacolor (print)	100	high	fine	good	depends on photofinish	daylight	C-41	1 hr - 1 d	Use high quality lab and shoot gray scale
	200	high	fine	good	depends on photofinish	daylight	C-41	1 hr - 1 d	Use high quality lab and shoot gray scale
	400	moderate	fine	good	depends on photofinish	daylight	C-41	1 hr - 1 d	Use high quality lab and shoot gray scale