

Chapter 5: Photographing Injuries

Reading:

Ricci L. Photographing the physically abused child. Principles and practice. AJDC 1991;145:275

It is tempting to think that an expensive camera is necessary to take good medical photos. For the most part, this is not true. Good photography starts with the photographer, not the camera. There are many camera choices available. For the sake of this discussion, we will assume the use of a digital point and shoot camera with some advanced features.

A. Which Camera

We are finally reaching the point where increasing megapixels is not the great advance it once was. Even a three megapixel camera can produce a respectable 8X10 image. Virtually all the cameras you will look at will have at least five megapixels. There is little reason to pay more to increase camera resolution, other factors are more important. The features we will regularly use are, macro focusing, forced or suppressed flash, focus lock, and spot metering. An auto bracket feature may be helpful as well. The ability to rapidly access these features, long battery life, a quick shutter response, and overall ease of use will determine the right camera for the job. Also, do not forget to buy a large megabyte storage card that fits our camera. Remember, different media fit different cameras.

We will use the following procedure for taking photographs, prepare, compose, focus, expose, review, repeat. Each step is important, and having a routine will mean better photos.

B. Prepare

Both the subject and the camera must be prepared for imaging. We will attend to the camera first, because it does not lack patience. Have a fully charged battery and storage media with available storage space in the camera. Turn the camera on. Be sure all of the settings are what they should be.

Macro Focusing	ON (tulip symbol)
Focus Area	Locked
Metering	Spot
Flash	Forced Flash (lightning bolt without "A")
Auto Bracketing	See text

More advanced settings must be individualized camera by camera. The settings menu of many digital cameras may allow you to adjust white balance, color saturation, and in camera image sharpening. Usually, these are left at the default settings. You may find, however, that changing these produces more natural skin tones, or sharper images. Careful experimentation may enhance your photos. When experimenting, however,

return your camera to a “fail safe” setup before storing. You do not want an unsuccessful experiment to be set when your next patient comes in.

The patient must be prepared for imaging as well. Consent is not required to image findings that may provide evidence of child abuse. If you are taking photos of an interesting non-abuse findings, however, consent should be obtained. Additionally, the child must be cooperative, and so the assent of the patient is important. A cooperative patient can be placed in a position where the finding is exposed and well lit. A blue towel or drape forms a good background, and helps the camera properly expose the skin. Finally, a sticker or card with a size standard, typically a ruler, and the patient’s name should be placed in the field of view. The AFBO L shaped ruler is the most commonly used implement for photographic size standards. More convenient stickers may be obtained from police supply catalogues. Sometimes a color standard is recommended as well. These are harder to obtain, and may be dispensed with if the CHAMP physician will be testifying to their own photos.

C. Compose

The most accurate image will be obtained if the plane of the camera’s CCD, the plane of the lens, the plane of the size standard, and the plane of the patient’s skin are all parallel, and the size standard is the same distance from the camera as the injury. This is hard to arrange when the skin surface is curved, and the injury is large. As long as the plane of the camera, and the size standard are parallel, multiple images should be taken, from a variety of angles, to deal with curved skin and large injuries. The size standard must always be at the same distance from the camera, as the most important part of the injury.

In general, it is good not to focus in too close, too soon. A backed off view of the body, with the injuries visible, will help locate the injury on the patient as a whole. Then the CHAMP physician may move in for a regional view, and ultimately for a tight close up of important details and measurements. Some cameras take better macro images by moving in very close with the zoom lens at wide angle settings. Unless this is so, however, it may be better to zoom in using the optical (not digital) zoom. Long lenses shot from a distance give less distortion and better focus edge to edge than short lenses moved in close. Too close a flash distance may wash out an image as well. Experimentation before hand will make the CHAMP physician a better photographer, and it is always a good idea to do it both ways, if you have the opportunity.

D. Focus

Autofocus is certainly the best option in a digital point and shoot. While manual focus is available, trying to measure the distance from the camera to the subject, or focus by eye in the LCD screen, are not acceptable options. Because medical photographs often call for moving in close, the macro-focusing mode should be engaged. There may be a button on the camera, or you may need to move through menu screens to engage this feature. Typically it is marked with a picture of a tulip. The default auto-focus mode in most cameras, calls for the camera to analyze the image and automatically pick a focal point.

When the camera picks wrong, you must either try again, or be surprised by a blurry photograph. Cameras may let you lock the focus area, and this option should be taken if available. You may lock the focus to the center position, or, in some cameras, you may choose from an assortment of focus point locations on the screen. Cameras have a hard time focusing on wide areas of skin. A locus of sharp contrast will make it easier for the camera to focus properly. If the focus point is aimed at the edge of the size standard, the shutter release may be pressed halfway to engage and lock the focus. Then the image may be re-composed, while holding the shutter release half way down, and the picture taken.

Depth of field is the range over which the camera is in sharp focus. When depth of field is narrow, the focal point may be very sharp, but portions of the photo that are a little closer or farther from the camera are blurry. If this is a problem, switching the camera to aperture priority mode will allow you to choose a smaller aperture and increase the depth of field. Aperture is indicated by the f-stop number. A large f-stop number indicates a small aperture and will give a greater depth of field. Shooting at f 16 or f 32 will result in a large depth of field. It will also result in a slow shutter speed, increasing the risk of camera shake.

Not all blurry photos are the fault of poor focus. Motion artifact also shows as blurring. Having a still patient and a still hand helps. If motion artifact is an issue, switching the camera to a shutter speed priority, and taking the picture at a high shutter speed will help. Be careful, as increasing the shutter speed above the “flash synch” speed will produce poor results. This choice will also force the camera to use a wide aperture, making depth of field less. Finally, when pushing the shutter button, brace your arms against your body, your body against a large object, hold your breath, and squeeze slowly and smoothly, don’t jab at the shutter release.

E. Expose

Once again, letting the camera choose exposure settings with the automatic or program exposure mode is usually the best option. Another metering option is between matrix, center weighted or spot metering. Matrix metering is like auto focus zone. The camera will analyze the whole image area and choose a compromise exposure setting. In this situation, a white drape or light clothing may cause under-exposure of dark skin. As long as the most important part of the image is kept to the center, spot metering will ignore the rest of the field of view, and expose the most important area the best. For this reason, spot metering, or if it is not available, center weighted metering is the best choice.

Flash is usually the best lighting for natural appearing skin tones, and good even light. Cameras often choose whether or not to fire the flash. Setting the camera so that the flash fires every time is the preferred option for medical photography. In some cameras, this is not available in auto-exposure mode. An alternative “program” mode gives more control and allows you to force-fire the flash. The flash will still automatically adjust its output. If the room is very brightly lit, the flash will fire less. In this circumstance incandescent lighting will give an overly red skin tone, and fluorescent lighting will give an overly

green skin tone. Reducing the room lighting will let the flash dominate more. When the camera is very close to the skin, the flash may not be able to reduce its output enough, resulting in washing out of the image. Putting a small piece of tissue paper over the flash will decrease and diffuse the light, often giving a much better image.

F. Review

The beauty of digital cameras, is that photos are available for immediate review. It is often difficult to identify weaknesses in an image on the camera's small LCD screen. While reviewing images, the zoom function will allow you to enlarge the on screen view, and the camera's four way controller will allow you to move around the image. With these features you can look at the most important parts of the image to assure that you have gotten the right exposure, and good sharp focus. When there is any doubt, it is always good to do it again.

G. Repeat

Excellent photographers shoot a lot of images and throw most of them away. Repeating is a sign of high ability, not low. Additionally, repeating gives you the chance to experiment. You may re-frame the image, change the angle, etc. The most common reason to repeat images is to "bracket" the exposure.

Bracketing means taking photos at both higher and lower exposures than the ones recommended by the camera. Digital cameras provide two ways of doing this without leaving the auto-exposure mode. The first is the Ev adjustment. Some cameras make this easily available, while others make you engage a series of menu screens. This adjustment lets you expose above and below the recommended exposure level. Typically this is referred to in "stops" Exposing 1 to 2 stops above and below the recommended setting will give a wide range to choose from. Some cameras offer an auto bracketing mode. In this mode a series of three or five images is taken, a predetermined number of stops above and below recommended exposure. All the images are saved, and you will be able to choose the best one during later review. Finally, some newer cameras have a "best shot setting". In this setting, the camera takes a series of shots, evaluates them and saves the best one. Usually this is not a good substitute for the other options.

H. Special Circumstances

Special problems call for special solutions. Occasionally the above advice must be abandoned, or novel measures are necessary. Flash gives great light, but tends to flatten elevated skin findings. Lighting from the side, will make an elevated scar pop out. Advanced systems allow you to take the flash off and fire it from the side. For the point and shoot, suppressing the flash (lightning bolt in a circle with slash) and using an exam light shined from the side will achieve this effect, though color may be different. Sometimes scaly or "ashy" skin makes seeing a subtle mark difficult. Wiping the skin with a moist paper towel will often suppress this problem. This creates problems of its own, as wet skin is very shiny. As the water evaporates a balance can be achieved

between the two issues. This will take patience, however. As mentioned above, when the flash is too bright, putting a small piece of thin white paper over the flash will diffuse it, and give a better effect.

I. Conclusion

If you carefully prepare, compose, focus, expose, review and repeat, you are likely to get good photos. Often these will be better than those provided to you by other sources. If you also play with the camera, and experiment, you will become an even better medical photographer. Eventually the equipment, not the photographer, will become the limiting factor. At that point, it may be time to move up to a digital SLR, medical macro lens, and ring flash, or other set-up. Such a set-up, however, can overwhelm the beginning medical photographer. We do not recommend this equipment as an initial purchase.