

## Chapter 7

# Evidence Photography— Basic Concepts

## Chapter Overview

It is possible to reconstruct a crime by analyzing the location and appearance of physical evidence found at the crime scene. Therefore, the location and appearance of evidence must be accurately documented. Photographs, supported with notes and crime scene diagrams, help investigators, and ultimately a jury to understand the evidence and its importance to the case.

All evidence located at the crime scene must be documented photographically before it is collected. These photographs of evidence are done after the overview photographs have been taken of the scene. After evidence has been collected, it may be necessary to take more detailed photographs of some of the items of evidence in a laboratory setting where specialized photographic techniques may be employed.

## General Principles in Evidence Photography

First, we need to be aware of the general principles for documenting evidence with photography. These general principles involve the number of photographs to be taken, the use of scales and marking devices, camera orientation, composition, lighting, and focusing.

### Number of photographs

When photographing most evidence at the crime scene you must take at least two photographs of each item of evidence. There can be some exceptions, such as in photographing fingerprints (which will be discussed in the next chapter), but normally two photographs of each item of evidence are needed.

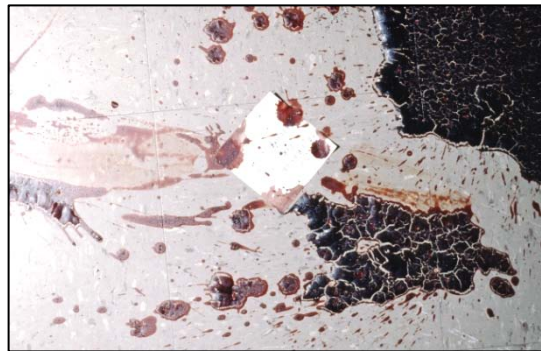
The first photograph should be a mid-range view of the item of evidence to show its location in the scene and how the item is related to its surroundings. This photograph must show clearly where an item is located in relation to other parts of the immediate area of the scene. The immediate area of the scene will also be shown

in your series of overview photographs of the larger area of the scene. For example, an overview photograph shows the area of a room which contained a sofa, coffee table and the body of a victim. The mid-range photograph would show the body and a knife alongside the body. This mid-range photograph shows where the evidence, in this example a knife, is located in the scene.

If you happen to have several items of evidence that are located close to each other you may be able to show all the items of evidence in one mid-range photograph. Again, the purpose this first photograph is to show where individual items of evidence are located within the crime scene.



A mid-range view of the item of evidence shows its location in the scene and how the item is related to its surroundings.



A close-up view shows the detail of the item of evidence.

The second photograph of the item of evidence should be a close-up view to bring out the detail of the object itself. The item of evidence is photographed without moving the evidence or anything surrounding it that may also appear in the photograph.

In some situations, something may have to be moved in order to photograph evidence. In such a situation it is best to photograph everything else in that area of the scene first, and then photograph the area that must be disturbed as each modification is made. For example, if you need to photograph items of evidence under a victim's body you would first photograph the area around the body, the body from different angles, and then move the body to photograph the additional evidence.

Often, additional photographs of items of evidence must be taken following the two photographs just discussed. These additional photographs may be needed to show more detail in the evidence. These additional photographs can sometimes be taken without moving the evidence or may need to be taken after collecting the evidence. Also, these additional photographs may be needed to show different sides or surfaces of the evidence that were not visible where the evidence was originally located, or may require specialized lighting or techniques, such as macro

photography or ultraviolet photography. These additional photographs may be taken at the scene, perhaps on the top of a portable table at the command post, or later at the crime laboratory.

### Using scales and marking devices

Frequently, scales are used in photographs of evidence. However, not every item of evidence documented photographically at a crime scene requires a scale in the photograph. For example, a photograph of a gun on the floor at a homicide scene usually does not need a scale. The gun will be collected as evidence and will not change its dimensions. It can be measured at any time if its size later becomes an issue. Scales should only be used when necessary to show relative size in a photograph or when the photograph will be used to later make a comparison, such as a comparison between the photograph of a footwear impression from the scene and a suspect's shoe. It should be noted, however, that some departments require, by policy, that a scale appear in every photograph of evidence.



First, photograph the item of evidence without any scale or marking device.

Second, photograph the item of evidence with the scale or marking device.

Marking devices (such as numbers, arrows and identification cards) should only be used in photographs when necessary. Numbering devices for each item of evidence are unnecessary unless similar items appear in the scene. For example, when there are several footwear impressions at a scene, each impression should be photographed with a numbering device to clearly differentiate one from another and to indicate where each was located within the crime scene. It should be noted, however, that some departments require, by policy, that a numbering device appear in every photograph of evidence.

Other devices, such as pointers or arrows, are sometimes used in evidence photographs to point out an item that may be hard to see or to indicate north. For example, a bullet fragment mixed in with broken glass may be difficult to see so a pointer or an arrow may be used to show its location. An arrow may be used in a

photograph of a footwear impression to orient the evidence and indicate a suspect's direction of travel.



A pointer was used in this photograph to show the location of a bullet fragment mixed in with broken glass.

When a scale or marking device is used in a photograph, two photographs must be taken. The first photograph should not contain a scale or marking device. This is done so the area that will be blocked or covered with the scale or marking device in the second photograph can be clearly seen in the first photograph. The second photograph would then

contain the scale or marking device. This two-photograph technique is done so that there is one photograph that shows the area without anything introduced into it by the investigator. Then it cannot be argued that there are no photographs of the scene before it was altered by placing scales or marking devices in it, or that the scale or marking device in a photograph was concealing other evidence.

Always use a measuring or marking device that cannot be mistaken for evidence. Sometimes an investigator will be without a scale and will place a business card, writing pen, or other item in a photograph to show scale. Using anything other than a scale in the photograph is confusing. Such items may be mistaken for evidence. Always be sure you have a sufficient supply of scales in your identification kit.

### **Camera and scale orientation for close-up photographs**

When taking close-up photographs to show the detail of the evidence you should, whenever possible, position your camera to minimize distortion in the photograph. This can be accomplished by keeping the camera's film plane parallel with the plane of the evidence. In other words, position the camera at a 90 degree angle to the evidence. Taking a photograph with the camera positioned at an oblique angle will introduce distortion into the photograph. This becomes extremely important when photographing evidence in which the photograph will be used for measurements, such as blood stain evidence, or comparison purposes, such as footwear impression evidence.





Improper camera position for photographing evidence. The camera is positioned at an oblique angle to the evidence.



Proper camera position for photographing evidence. The camera's film plane is parallel with the evidence.



Improper scale position for photographing evidence. The scale not positioned on the same plane as the evidence (a fingerprint on the knife handle).



Proper scale position for photographing evidence. The scale is positioned on the same plane as the evidence.

When a scale is used in a photograph the scale must be positioned on the same plane as the evidence. Taking a photograph with the scale on a different plane will introduce distortion into the photograph and the scale will be virtually useless. This also becomes extremely important when photographing evidence in which the

photograph will be used for measurements, such as blood stain evidence, or comparison purposes, such as footwear impression evidence.

## Composition

When taking close up photographs of evidence it is important to "fill the frame" with the subject. This makes the subject as large as possible in order to record greater detail.



Poor composition — Left: photograph taken from too great a distance. Right: vertical orientation results in unused space that could have been used to take a closer photograph of the evidence.



Correct composition — "Fill the frame" when photographing evidence to record as much detail as possible.

## Lighting

One of the most important skills for a crime scene photographer to master is the proper use of light. If you always rely on existing light or direct flash to light your evidence you will have many poor photographs.

Understanding and using proper lighting techniques will result in high quality photographs. Each time you prepare to photograph an item of evidence stop and analyze the lighting you are using. You may find that by changing the direction or intensity of the light on the evidence, or by taking several photographs with the lighting from different angles, will give you improved results.

When evaluating lighting, remember what you see in the viewfinder is what you will get in your photograph. Position the camera and examine the image in the viewfinder. If the existing (ambient) lighting provides adequate results you may be able to take the photograph with the existing light.

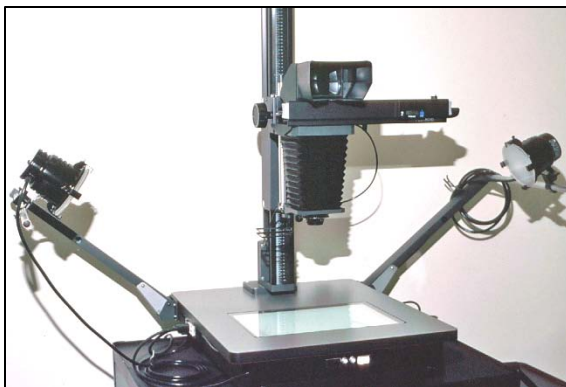
If existing lighting does not provide the desired results you must change the lighting. You can preview how the photograph will look with other light angles by moving a lighting source, such as a flashlight, around to different angles while looking in the camera's viewfinder. When the best angle of light for the evidence is observed, place the electronic flash, or other light source, in that position for the photograph.



A wide angle diffuser or handkerchief over the flash head will soften the light from an electronic flash.

When using an electronic flash, beware of overexposure from too much flash. For close-up photography you can reduce the intensity of the flash by using wide angle diffuser, handkerchief or other diffusion material placed over the electronic flash head, or by positioning the flash further away from the subject. This will help avoid overexposure.

Other lighting devices may be effective for certain types of evidence. They include micro flash (two small electronic flash units on adjustable arms) and, ring light flash units.



A laboratory copy stand is most efficient in photographing evidence in a controlled setting.



A portable copy stand or a tripod can be set up at the crime scene to photograph evidence.

Ring light flash units are best in lighting non-reflective evidence such as injuries on a victim. A ring light flash provides shadow-free lighting and low contrast. A ring light flash is usually not suitable for photographing textured items or impressions, such as tool marks and footwear impressions, because it eliminates the shadows that help to show detail in such evidence.





Micro flash



Ring light electronic flash.

## Digital images

When photographing with a digital camera all photographs should be taken in color mode. Even if the finished photograph would be better in black-and-white it should still be taken in color when using a digital camera. By photographing in color, subtle tones that could be lost when photographing in black-and-white mode will be captured. Later the color digital photograph can be changed into grayscale in a program such as Adobe® Photoshop®.

When photographing with a digital camera the image type is an important consideration. Taking general photographs as JPG or TIF files can be acceptable. However, when attempting to capture fine detail in close-up photographs of evidence, JPG and TIF files may be unacceptable. This is due to the fact that images taken in JPG and TIF are compressed by the camera when the photograph is taken, and the compression (the 12- or 14-bit color depth is reduced to 8-bit) results in the loss of color depth which often results in loss of detail in the highlights and midtones.

When photographing evidence containing fine detail with a digital camera it is highly recommended the images be captured as RAW files. RAW files are unprocessed data directly from the imaging sensor and saved in their true, 12 or 14 bit color depth. RAW files are read-only files and must be converted to another type after they are processed. It is recommended RAW files be enhanced (in a program such as Adobe® Photoshop®) and then saved as TIF files.

## Film

Mid-range photographs which show the location of evidence are normally taken with color film. The use of color film provides photographs that look natural and are easier to understand than black-and-white photographs.



However, when doing close-up photographs of evidence, the crime scene photographer must decide whether to use color or black-and-white film. Some evidence photographs may need to show the color of an item, such as the color of paint used in a vandalism case, or to identify evidence on a background, such as bloodstain on a multicolored wall. In these cases color print film would be used.

Some other types of evidence should be photographed with black-and-white film to show greater detail since black-and-white film provides more contrast than most color films. Fingerprints, impressions and tool marks are usually photographed with black-and-white film.

## **Exposure**

Correct exposure is critical in evidence photography. Incorrect exposures can result in lost detail in a photograph. Most evidence photography is done with either ambient light, which may be steady burning lamps or simply the light existing at the location, or electronic flash.

Ambient light exposures can often be metered with the camera's internal exposure meter or an external exposure meter. However, before relying on any reflected light exposure meter, you should determine if the meter will be providing an accurate reading due to the subject or background about to be photographed. Exposure meters use 18 percent reflectance in determining exposure. If you are photographing evidence or a background that does not have 18 percent reflectance then the exposure reading can be in error. For example, when the evidence you are photographing is a dusted fingerprint on a white surface, an exposure meter will, as always, base its exposure settings on 18 percent reflectance. Since the subject matter in the photograph is almost all white, the meter will provide exposure settings that result in an underexposed photograph. Much of the detail in the photograph will be lost. A second example would be a dark item, such as a section of charred wall at an arson scene. The exposure meter will base its settings on 18 percent reflectance and would provide an exposure setting that results in an overexposed photograph. Much of the detail in the charred wall will be lost.

When using ambient light for evidence photographs you can insure accurate exposures by using an 18 percent gray card. Position the 18 percent gray card in front of the exposure meter, or in front of the camera lens if you are using the camera's exposure meter, to obtain the correct exposure settings. Be sure the ambient light is falling on the 18 percent gray card the same as it is falling on your evidence. Use the settings indicated by the exposure meter for the photograph. In many cases, bracketing should also be considered. Bracketing will provide a series of photographs at different exposures. Later, the best exposures from the series of photographs can be used for the investigation.

Normal electronic flash exposures can be done in either automatic or manual flash when photographing evidence. Through-the-lens (TTL) electronic flash unit exposures will be controlled automatically by the camera's TTL flash metering system. When using electronic flash, bracketing should also be considered. Bracketing will provide a series of photographs at different exposures. Later, the best exposures from the series of photographs can be used for the investigation.

## **Focusing**

When taking close-up photographs one of the most common problems encountered is shallow depth-of-field. Therefore, accurate focusing is critical. One important technique regarding focusing for close-up photography is to avoid focusing on the scale. Instead, be sure to focus on the evidence. While it is frequently easier to focus on the markings or edge of the scale, the scale may not always be on the exact plane of the evidence. It is better to have a sharp image of the evidence and a slightly out of focus scale than to have a sharp image of the scale and the evidence out of focus.

The best way to get sharp images is to stabilize the camera on a tripod or copy stand. Once the camera is stabilized, fine focusing can be done with greater accuracy. When the camera is stabilized you can use a combination of focusing with the lens and moving the camera and evidence closer together or further apart to get the sharpest focus.

If you are hand-holding the camera while taking a close-up it is usually difficult to get the sharpest focus. This is because if you are both moving the camera slightly and focusing you are in effect chasing a moving target. To focus close-up while hand holding the camera you should first rough size (scale) the subject by focusing with the lens focusing ring. When you have the evidence just about focused in your viewfinder, stop focusing the lens with the focusing ring. Then you can fine focus the subject by moving the camera in and out from the subject. While maintaining the fine focus by moving the camera in and out slightly, lightly depress the shutter button to take the photograph.

## **Establishing the location of evidence with a series of photographs**

Sometimes it may not be possible to show the location and detail of evidence with just two photographs, as discussed earlier in this chapter. Evidence may be located in an area with no landmarks nearby, such as in an open area of the desert. In this case the use of a GPS device (to give location) and a compass (to indicate direction the evidence is oriented) may be the only way to document the exact position of the evidence. In such a case you could record the GPS information in your notes, and in the photograph of the evidence include an arrow that is oriented to indicate north.

However, if the item of evidence is in a remote area but there is a landmark relatively nearby, you can show the location of the evidence with a series of photographs. Begin with an overview photograph that shows the general area. In this photograph include a recognizable landmark. Photograph street signs, if possible, to identify the area. Then take a series of photographs that lead the viewer to the location of the evidence.



The first photograph includes a recognizable landmark.



The second photograph points to the location of the evidence, in the example, toward the end of the street.



Subsequent photographs lead the viewer to the location of the evidence.



The last photographs show the evidence at its exact location.

## Close-up lenses and devices

To record fine detail when photographing evidence, the item of evidence should fill the frame of the camera's viewfinder. Since most normal lenses are designed to focus from about three feet to infinity, they cannot focus close enough to be effective when photographing small items of evidence. A standard lens can be used to photograph a footwear impression but cannot be focused close enough to photograph a latent fingerprint. A macro lens or some type of close-up accessory will be needed when a close-up photograph requires the lens to focus closer than three feet.



Close-up Equipment — clockwise from top left: bellows, macro lens, reversing ring, close-up filters

A macro lens or some type of close-up accessory will be needed when a close-up photograph requires the lens to focus closer than three feet.

A macro lens is a lens that is designed for moderate close-up focusing. True macro photography begins when the image size on the film equals the actual subject size (1:1 magnification) or is magnified to larger than life size. Not all macro lenses can actually produce a 1:1 image on the film. However, macro lenses that come close to 1:1 magnification can usually be used for photographing items of evidence as small as a latent fingerprint.

Close-up accessories can be used in place of a macro lens. Close-up accessories include 1:1 adapters, extension tubes, extension bellows, reversing rings, and close-up filters.

A 1:1 adapter is a device that screws onto the front of the camera's normal lens. The 1:1 adapter magnifies the image to produce a life sized image on the film. 1:1 adapters can produce photographs with out of focus edges if you use large lens openings. To increase sharpness use a lens opening of  $f/8$  or smaller when photographing evidence with a 1:1 adapter.



1:1 adapter screws onto the front of the camera's normal lens.



Extension tubes and extension bellows extend the lens away from the film creating greater magnification. 1:1 or greater magnification can be achieved with extension tubes or bellows.

A reversing ring allows you to reverse-mount a normal lens on the camera. This results in enough magnification to effectively photograph an item of evidence about the size of a latent fingerprint.

Close-up filters are relatively inexpensive lenses that screw on the front of the camera's normal lens. These close-up filters are rated in diopters of magnifying power such as +1, +2 and +3. The close-up filters can be combined to make new powers (e.g., a +2 combined with a +3 becomes +5). When these close-up filters are attached to a normal lens the +1 focuses at about 20 inches, the +2 focuses at about 13 inches, the +3 focuses at about ten inches, and the +5 focuses at about four inches. When using more than one close-up filter on a camera lens, the filters should be placed on the lens in descending order. For example, when using a +1 and a +2 filter, place the +2 on the camera lens first, followed by the +1. Close-up filters can produce photographs with out of focus edges if you use large lens openings. To increase sharpness use a lens opening of  $f/8$  or smaller when photographing evidence with close-up filters.



Extension tubes are placed between the camera body and the lens to increase magnification.



Reverse-mounting the lens creates magnification.



Close-up filters screw on the front of a normal lens to provide increased magnification.

## Summary

In any crime scene investigation, the location and appearance of physical evidence must be documented. Photographs play a key role in this type of documentation. Understanding and using the basic concepts in this chapter will enable the crime scene photographer to take the high quality photographs necessary for successful investigations.

