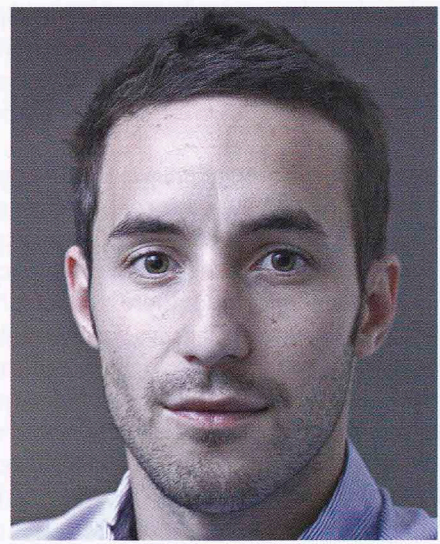


Tim Zoltie

BASIC PRINCIPLES IN THE PROVISION OF PHOTOGRAPHIC EVIDENCE



With a multitude of photographers in the world combined with the ease of automatic digital photography, how can photography become a more reliable source of evidence?

A standardised method of practice based on an understanding of the basic principles of photography is the key. Anyone undertaking photography where the images may ultimately be relied upon in the court of law must possess an understanding of these basic key principles and an in-depth knowledge of the impact they may have on the depiction of the subject matter.

“Perspective in a picture is concerned with depicting the volumes and spatial relationships of the subject”

Aperture, Shutter Speed and ISO

To achieve accurate exposure a photographer must balance aperture, shutter speed and ISO. Each of these variables can impact the final photographic image in different ways. An image shot at a slow shutter speed may cause motion blur, an image shot with high ISO may cause grain, and an image captured with a large aperture will create a shallow depth of field. The subject matter being documented will determine these variables. For instance; to photograph an abnormality to the proximal nail fold cuticle a small aperture of f22 would be required, creating a wider plane of focus. (see box on p20)

Perspective and Angle of View

Perspective in a picture is concerned with depicting the volumes and spatial relationships of the subject(s) on a flat surface. It is governed by the subject to camera distance. Perspective in the context of medico-legal photography can lead to inadmissible evidence. For example, a plastic surgeons report on a rhinoplasty may state a claimant has an inverted V deformity as a result an excision of dorsal cartilage from the septum. An inferior view would provide an accurate depiction of the V deformity but using a 50mm lens on a full frame digital SLR camera will give a distorted perspective. The camera to subject distance must be increased.

Incorrect positioning can also cause perspective distortion but can be avoided by keeping the camera parallel to the plane of focus (also ensuring the subject falls within focus plane).

Colour Balance

We see in colour, and accurately re-creating colour whilst understanding its impact is fundamental. Accurate colour reproduction is achieved through colour balancing; the adjustment of colour intensity so that objects which appear white for example, are rendered white. For a photograph to be a true and accurate record of the subject, what the camera saw must be matched with what our brain sees. Inaccurate colour balance on an area of redness or inflammation may not show up the injury or at the opposite end of the scale; may exaggerate the inflammation. To avoid unnecessary colour casts, a photographer must use a grey card during the photography process to enable consistent colour balancing and exposure. Calibrated monitor and printer equipment must also be used.

Lighting

Lighting can be controlled in terms of:

- Quality
- Quantity
- Colour
- Direction

Quality

This refers to whether the light is diffused or un-diffused.

Diffused light is usually bounced off a reflector or transmitted through diffusion material. Common in portrait or wedding photography, it has the property of light photons attacking the subject from many different angles. Its effect is to give soft shadows and desaturated colours in the subject.

Un-Diffused light sources are usually small in relation to the subject that they are illuminating. They fire photons at the subject that are effectively more parallel than those coming from an un-diffused source. The effect of this is that the light is harder. Subjects will display more detail and colour contrast in their surface but will also create harsher shadow.

Quantity

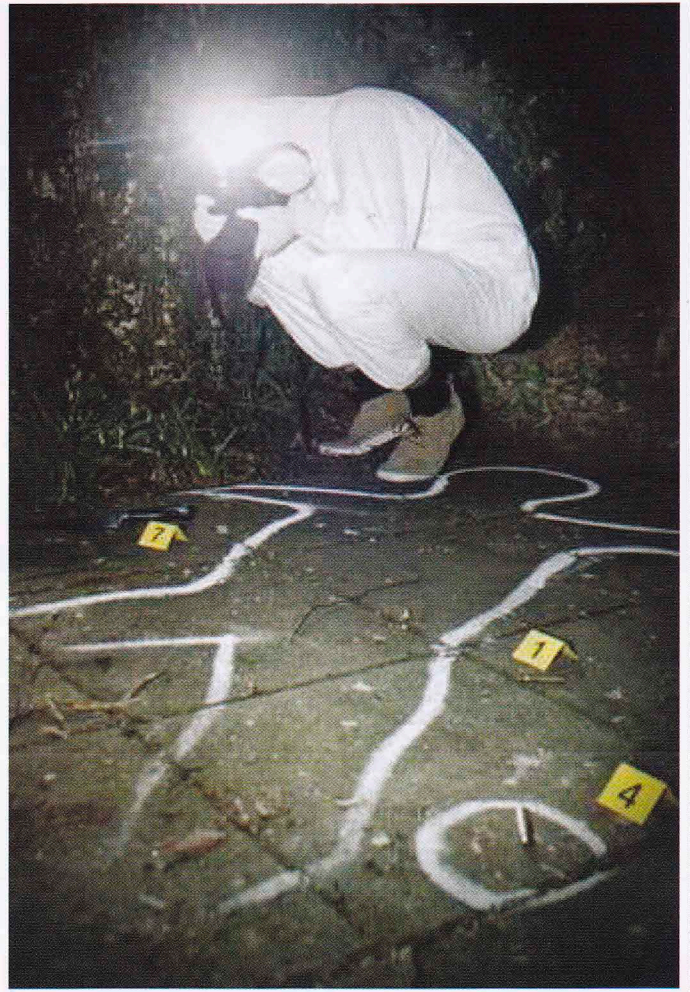
When looking at quantity; light is important and the more of it, the more accurate the subject matter can be documented using a faster shutter speed, lower ISO and smaller aperture. Using an external flash can provide control to both quantity and direction of light.

Colour

The subject being documented should appear in the photograph exactly as it does in reality. For situations where the photographer wishes to document the lighting conditions at a scene of crime or accident, ambient lighting may suffice however when documenting evidence such as scarring to an injured person, ambient light can cause inconsistencies in exposure and create colour casts. In these cases flash lighting must be used to negate the effect of the ambient light.

Direction

The angle of a light source falling on a subject can greatly alter the viewer's perception of the subject matter. The further the angle of light from the lens the greater the shadow. As shadow can result in a valuable loss of information within an image, documenting a clinical subject requires even illumination.



Using a flash connected to the camera hot shoe by an 'off camera cord' enables the photographer to manually control the angle at which the light falls on the subject. A light placed axial to the camera lens (effectively right next to the camera lens) will give flat, even lighting. Flash units either side of the lens (ring flash) will also provide a similar effect, minimising shadows but causing shapes within the subject to be flattened.

Moving the flash away from the lens but still pointing it at the subject will create cross lighting. This is an effective method of creating shadow to portray depth, subtle elevations and texture. A cross lit image should be supplied with a flat lit image to enable comparison and provide justification for this method of practice as it can be used incorrectly as an enhancement technique.

Standardisation

With so many variables in photography altering the end result, authenticity falls not on the photographic evidence itself, but the person photographing it. Standardisation is key to ensuring credibility and authenticity through the use of standard operating procedures. In clinical photography, standardisation ensures that any changes appearing in a series of photographs over time are changes to the subject matter and subsequently not caused by any alterations in the capturing process. A standard operating procedure must include variables such as scale, positioning, background and post production methods.

The Effect of Aperture

These two photographs were shot at the same focal distance (105mm) at a 1:1 close up ratio at two different apertures. The image on the left was shot at f2.8 creating a substantial focus drop off, whereas the image on the right was shot at f22, providing an increased depth of field leading to accurate focus throughout.



Distracting Elements

Possibly the least important of the above principles, but none the less one which should not be underestimated, is the impact of a distracting element. In terms of photographic evidence, the subject matter should be the centre of focus with all competing elements eliminated. In clinical photography distracting elements can range from earrings in shot when photographing a pinnaplasty to hair not tied back when documenting facial contact dermatitis. Both of these can directly affect the end result, not only by distracting attention but more importantly failing to portray the full extent of the injury. Background choice is also important as it has the ability to alter colour from subtle reflections onto the subject, and to reflect light to cause flare. A clean, neutral, non-reflective surface should always be used. White can be used but extra care must be taken to control shadow (The closer the object to the background the minimal shadow created). Black is also a good background colour, but care must be taken to ensure edge lighting is used to avoid the edge of the subject blending in to the background.

Conclusion

There are many specialised photographic techniques and methods of practice in producing photographs for evidence; including those of forensic sciences, scenes of crime/accident, and investigative services. Many of these go beyond the scope of this article, but the above principles are provided as an introduction to the basic

factors which can impact on photographic evidence.

Many medico-legal experts now include photography in their reports, and increased competition has meant professional photographers are now expanding beyond the remits of their specific area of expertise.

What must be acknowledged is that photography is a complex area of practice with a multitude of specialities. It is governed only by how the user wishes to depict his/her subject for the purpose intended.

In the provision of photographic evidence this is important and as such, a relevant expert with an in depth knowledge on how to depict the specific subject matter should undertake this work.

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He now works as a clinical photographer at Leeds Teaching Hospitals NHS Trust. He is also an expert medico-legal photographer and Director of Clinical Photography UK, a leading provider of medico-legal photography reports for Personal Injury and Clinical Negligence claims.