Review Research Paper

Photography in Forensic Medicine: Guidelines and Recommendations in the Indian Perspectiv

[1]Puneet Setia, [2]Raghvendra Singh Shekhawat

Abstract

Photography has been an integral part of Forensic Medicine since time immemorial. Since these photographs are predominantly used for legal purposes, they should be as accurate and informative as possible. Photographs are not only important to document injuries, but also to document absence of injuries (*negative photographs*).The major factor with photography in Forensic Medicine is that the photographs are not repeatable and also that one copy has to be submitted to the courts. Therefore utmost care is required when the photographs are taken and preserved. A good photograph not only gives detailed information of the incident but also assists the court in administration of justice. The present paper not only addresses common problems faced by the Forensic Medicine experts while taking photographs, but also provides guidelines and technical suggestions for better photography. Along with that new concepts in medical photography are also discussed.

Key Words: Forensic Photography, Documentation, Court, Justice

Introduction:

In the Forensic Medicine Post-graduate curriculum, neither the speciality of Forensic photography is included, nor is any such training given. At many places, the photographs are taken by police personnel, who are neither trained in medicine nor in photography.

The end results are well known and don't need any description here. The same goes for the photographs taken in emergencies and mortuaries. This is quite expected that the photographs taken in the emergency rooms and mortuaries are often grossly non-descriptive and not up to the requisite standards.

The importance of photography in medico-legal cases has been advised in many documents of International repute like by The National Association of Medical Examiners, USA and in The Istanbul Protocol. [1-3] The National Human Rights Commission also makes video filming of post-mortem examinations in cases of custodial deaths mandatory. The growing trend among medical professionals is to use the mobile phones for taking pictures, as they are readily available. [4, 5]

Corresponding Author:

[2]Senior Resident
Dept. of Forensic Medicine
All India Institute of Medical Sciences, Jodhpur
E-mail: drraghavendrasinghshekhawat@gmail.com
[1]Assist. Professor
DOR: 20.05.2015 DOA: 03.11.2015
DOI: 10.5958/0974-0848.2016.00019.1

Although, many of the commonly available present day mobiles come with many features relevant for us, they also have their own inherent problems, which we will discuss later.

Additionally, there are problems with data protection and it also creates a bad impression regarding lack of professionalism.

There are some mistakes that are commonly committed by the person taking the photograph. While most of them are due to faulty technique, some are due to inexperience.

Some of the common mistakes are:

1. **What to photograph?** : It is commonly seen that the photographer doesn't even know what should be photographed. The injuries or lesions which need to be documented descriptively go unnoticed many times.
2. Poor choice of the Camera
3. Poorly Focussed Images
4. The camera shakes
5. Over-exposed and under exposed images
6. Poor colour reproduction
7. The glistening or glaring of wet surfaces
8. The image noise: Image noise is random (not present in the object imaged) variation of brightness or colour information in images, and is usually an aspect of electronic noise.

The Common Problems and their Remedies:

1. Consent:

For medico-legal documentation no guidelines are there to take the consent of the

person in India. As per the international guidelines specific consent of the live victim should be obtained before taking any photographs. The consent must be valid. [6]

Even if consent is not required for medico-legal cases, the patient needs to know that the pictures may be used for teaching purposes or for publication in medical journals. [3, 7] In author's opinion, whenever photographs are taken for academic purposes, consent should be taken from the patient him/herself or his/her relatives (in autopsies).

2. Following the "as is" Strategy:

It is always recommended to take the *"as is"* photographs of the subject, whether it is the emergency department or the mortuary.

If any changes need to be made, like removing the clothes, wiping the blood stains or mud stains etc. that should be done after taking the first photograph.

This not only helps in documenting the fresh injuries but also takes a record of the clothing, marks of identification, evidences of any prior medical interventions and the person/persons accompanying the subject.

3. The Logical Sequence:

Generally, it is best to start with overall photographs and then takes closer, more detailed pictures. The first photo should always be a colour cover sheet. These cover sheets have known colour values that make colour correction easier and more accurate.

The colour scale can also be used as reference. The logical sequence should be followed. First, the overall photographs should be taken. These should be followed with mid-range photographs. [8]

Mid-range photographs are important as they provide information of the relative location of injuries on the particular anatomical part of the body. This is often useful to avoid distorting the size or shape of the injury, and to prevent misinterpretation. [9] Close-up photos are next.

Close-up photos should be just that taken so that the injury nearly fills the frame. It is always a good practice to obtain an identification picture ("ID Shot") of the patient. This should be a frontal view of the victim and should clearly show the victim's face. [10]

4. Medically Important versus Forensically Important Images:

It should be borne in mind that many injuries which are seen in the Emergency Department or other wards might seem to be trivial and *"too small"* to be documented but they may have a tremendous Forensic importance. In a case of sexual assault, a simple tear of the fraenulum (at the base of tongue) may be overlooked by the treating physician but a forensic person can't afford to miss such a finding. It has been well said that in case of confusion, take as many relevant pictures as much you can, rather than having none! If you want to err, err on the side of safety.

5. Proper Use of Scales:

In Forensic photo-documentation one should always use a scale. For this, angled rulers, standard rulers and inch-tapes can be used. At times readily available standard objects like coin or matchstick can also be used. For injuries like bite-marks L-shaped rulers should be used. It is strongly advisable that the structure to be measured and measuring tape are both in the same plane and both of them are perpendicular to the optical axis.

6. The Identity of the Picture:

Non-identifiable pictures are useless for the court procedures. These can be used only for teaching purposes. Therefore date scales and the case number should be included along with the scales in every picture.

7. Simplicity:

A photograph should have only one primary subject e.g., an autopsy specimen, a gunshot wound, or a grazed abrasion. The value of a photograph with numerous visual centrepieces is often diminished by the resulting clutter and confusion it creates.

Therefore, when the photograph is planned, one should keep in mind what he/she wants to depict and click accordingly, so that it depicts only those aspects that are relevant.

8. The Choice of the Camera:

Although, the conventional 35mm cameras are said to be the gold standard for documenting forensic findings, they are rarely used now days. Any digital camera with four mega pixel capacity or more should be quite enough for documentation purposes.

Digital single lens reflex cameras should be preferred over digital compact cameras as they have better sensors.

Many digital cameras record metadata in their digital images, in formats like exchangeable image file format (EXIF) or JPEG. Some cameras can automatically include extended metadata such as the location at which the picture was taken (e.g., from a GPS).

As a simple rule to check for the suitability of the camera for f

Forensic use, you can take a trial picture of a printed text with eight point font size from 20 cm distance. If the text on the picture can be

read then it is a good camera for documentation purposes. [7]

9. The Out of Focus Images:

It is not unusual that while taking photograph of a lesion or an injury, the nearby surface is inadvertently focused. If this nearby surface is in a different plane then than that of the desired target, the picture will be blurred.

The same blurring and poor picture quality can also be due to unsteady shaking of the hand which is holding the camera. [11] Using a tripod or a stand can prevent shaking to a large extent.

10. Light and Background:

The photographs should be preferably taken in daylight or with background lightened. The presence of bright lights or reflective surfaces can produce a wash out of the detail (overexposure) and the injury will become less visible on the photograph.

Remember: lighting can be critical to the appearance of some injuries. The background shouldn't be crowded or full of bright colours.

Distracters like autopsy instrument, discarded clothing etc. should not be included in the photographs. During autopsies the organ can be put on a widely-spread gauze piece for taking a photograph. [9]

11. Understanding the "Proximity Effect":

The focal length of the lens together with the distance of the camera to the subject determines what is shown in the picture. Being very close to the subject will cause three-dimensional objects such as faces, for example: to appear out of focus.

This is called the proximity effect. Current photographic literature also uses the word **"wide angle effect"**. [12, 13] For Forensic examination, macro photography (extreme close-up photography) is important.

Most cameras can only achieve this very small distance to the subject by using a very short focal length (maximum wide angle). This can cause considerable distortion of the image.

12. Controlling the Exposure:

The most important factors which decide the exposure of a picture are aperture, time and sensitivity of the sensors. The present cameras either automatically adjust the exposure or give you an option for the situation. [14]

If the photographer is not an expert or a trained professional, it is advisable to use the default or auto setting of the camera for best effects.

13. Pictures from Mobile Phones:

As already stated, pictures taken from the mobile phones are not really sufficient for the legal purposes. If it is required to print bigger images of the photographs, the mobile phones often fail as they have low resolutions.

Even with higher mega pixels, the mobile does not give same quality as the camera as the aperture of the mobile phone is small, which causes less clarity in the photograph as compared to a camera. [15] Also, as the mobile phone lens has a wide angle, therefore the pictures are either distorted or blurred at the peripheries.

14. Photographing the Glistening "Wet" Surfaces:

Many of us have faced the situation where while conducting the autopsy, we find an interesting finding and we land up into agony as the photograph which was taken is *"not so informative"* due to the wet and glistening surface of the specimen.

Cross polarization is a technique used to capture back-scattered light from a subject while dramatically reducing or eliminating direct planar light that is reflecting from a subject, and is primarily used in nature photography. [16, 17]

This technique allows a photographer to reduce or eliminate glare caused by flash, commonly observed on oily, waxy, wet, or otherwise shiny surfaces. Cross polarization is particularly suited for autopsy photos.

This technique does not require a great deal of equipment. Aside from the camera and flash unit, a circular polarizer (attached to the camera lens) and a linear polarizing filter (attached over the flash) are required. [17]

15. Using the Flash Correctly:

To avoid the effects of camera shakes, a flash should be used. However, if a flash is used in an already bright environment it can lead to over exposure. Therefore, it is advisable to use the auto setting of the camera so that the flash is used only when required.

With digital cameras, using a built-in flash or a flash which has been specifically made for the camera offers the advantage that the white balance will be easy to do.

16. Dealing with Bloody Specimens:

In cases of road traffic accidents and homicides, often the bodies are stained with excess of blood. After taking the initial photographs, it is advisable to remove the excess blood. A photograph of an injury without pooled or smeared blood is more likely to be admitted into evidence and shown to the Magistrate than an excessively bloody one.

17. The "Special Cases":

In certain circumstances it becomes indispensible to meticulously document the injuries as in the cases of sexual assaults.

Gross visualization of the genital area post-sexual assault identifies some but not all injuries. To assist further in the identification and documentation of micro injuries, the use of toluidine blue dye and colposcopy are often employed. [18, 19]

18. Photo-editing:

Now-a-days the digital photographs can be easily edited with the help of innumerable soft-wares available on the internet. Things like genuine cropping of the pictures can be done.

Pictures can also be edited in retrospect and many sophisticated photo-editing software tools are available which allow a variety of changes to be made. However, with the advent of these smart techniques images can be drastically manipulated. A yellowish bruise can be converted into a blue one and vice-versa.

For forensic pictures, it is mandatory that the picture information produced by the camera is left in its original state. Changes made by picture-editing software should be avoided and if the correction of technical mistakes is unavoidable, it should only be done on copies of the original data. [20]

19. Storage and Backup:

a. **Conventional Photographs:** Obviously, the negatives of the photographs should be protected from heat and light. They should better be locked in a cupboard with limited access to outsiders. It is desirable if a catalogue is there for the stored photographs. There should be a chart which mentions the name of the person who gains an access to the pictures, along with the date and time when that person accessed it.

b. **Digital Photographs:** Whenever the photographs are transferred to the computer, at least two copies should be made in CDs. These CDs, after proper labelling, should be kept in a locked cupboard. Special precautions need to be followed for the pictures saved in the personal computers. It is all a matter of personal preferences that how the data is stored.

   It also depends on the computer literacy of the forensic expert as to what secure level he can store his data. The folders can be password protected. It would be advisable not to share the data on the "virtual drives" which are readily available on the internet as the possibility of hacking cannot be ruled out.

Hospitals may differ on their policy and practice of whether the photographs stay with the medical records or are archived separately. You should be familiar with the policy at the institution in which you practice.

Discussion and Conclusion:

Written descriptions, even in the best hands, are often inadequate to describe injuries.

Additionally, when the medical evidence expert is called in the court to appear as an expert witness, photographs serve as an aid to memory. [10] Much physical evidence is short lived and if not recorded early may be lost permanently. Injuries heal faster than the legal system operates.

The importance of good photographic skills in documenting the findings of the Medico-legal cases is undisputed.

Many technologies like **Google Glass and High-speed photography** are already into the market and are becoming the preferred choice of Medical photographers. [21]

Alternative Light Photography is a tool to help see damage even before it is visible on the skin. A camera such as the Omni chrome uses blue light and orange filters to clearly show bruising below the skin's surface. [22]

Infrared photography not only provides a new arena for the documentation of abrasions, bruises and laceration, but is equally important for bite mark analysis. [23]

In Indian context, where we often lag in resources and research work, an initiative is required from the Forensic community. It is desirable that Mandatory short-term (7 days) workshops should be frequently organised for training in Forensic Photography.

The workshops should include people both from the Medical as well as the technical fields. Along with this the interested experts can approach the online resources which are readily available. [4] In the end we would conclude by saying that there is no substitute for an expert and trained professional.

However at places where hiring the services of a professional are not possible, it is advisable to follow the guidelines mentioned in the article to get the best possible outcome with the resources available.

References:

1. **Peterson GF, Clark SC.** Forensic autopsy performance standards. The Am. J of Forensic medicine and Pathology. 2006; 27(3):200-25.
2. **Moreno A, Crosby S, Xenakis S, Iacopino V.** Implementing Istanbul Protocol standards for Forensic evidence of torture in Kyrgyzstan. Journal of Forensic and Legal Medicine. 2015; 30:39-42

3. I**stanbul Protocol:** manual on the effective investigation and documentation of torture and other cruel, inhuman or degrading treatment or punishment / Office of the High Commissioner for Human Rights Geneva. United Nations High Commissioner for Human R, editor. New York: United Nations; 2001.
4. **Dexheimer JW, Borycki EM.** Use of mobile devices in the emergency department. Studies in health technology and informatics. 2013; 192:1086
5. **Migliore M.** Smartphones or tablets for a better communication and education between residents and consultant in a teaching hospital. Journal of Surgical Education. 2013; 70(4):437-8.
6. Mosby's Medical Dictionary 2009 [cited 2015 February 18]. 8th edition:[Available from: http://medical-dictionary.thefreedictionary.com/consent.
7. **Ozkalipci O, Volpellier M.** Photographic documentation, a practical guide for non-professional Forensic photography. Torture: quarterly journal on rehabilitation of torture victims and prevention of torture. 2010;20(1):45-52.
8. **Spraggs D.** How to Photograph Injuries 2007 [cited 2015 18 Feburary]. Available from:http://www.policemag.com/channel/patrol/articles/2007/09/how-to-photograph-injuries.aspx.
9. **Redsicker, David R.** The Practical Methodology of Forensic Photography: General Shooting Tips. Boca Raton, Fla. : CRC Press; 2000.
10. Forensic photography: In: Emergency Care of the Abused. [Internet]. Cambridge: Cambridge University Press. 2008 [cited Accessed 17 February 2015]. Available from: http://dx.doi.org/10.1017/CBO9780511547232.010
11. **Dolinak D, Matshes E, Lew EO.** Forensic Pathology: Principles and Practice: Elsevier Science; 2005.
12. **Verhoff MA, Witzel C, Kreutz K, Ramsthaler F.** The ideal subject distance for passport pictures. For. Sci. International 2008; 178(2-3):153-6.
13. **Verhoff MA, Witzel C, Ramsthaler F, Kreutz K.** [The influence of camera-to-object distance and focal length on the representation of faces]. Archiv fur Kriminologie. 2007;220(1-2):36-43.
14. **Verhoff MA, Kettner M, Lászik A, Ramsthaler F.** Digital Photo Documentation of Forensically Relevant Injuries as Part of the Clinical First Response Protocol. Deutsches Ärzteblatt International. 2012; 109(39):638-42.
15. **Skandarajah A, Reber CD, Switz NA, Fletcher DA.** Quantitative Imaging with a Mobile Phone Microscope. PLOS ONE. 2014; 9(5):e96906.
16. **Anderson RR.** Polarized light examination and photography of the skin. Archives of dermatology. 1991; 127(7):1000-5.
17. **Potash GD.** Forensic Tips. Evidence Technology Magazine. Sep-Oct 2010.
18. **Sommers MS, Fisher BS, Karjane HM.** Using colposcopy in the rape exam: health care, forensic, and criminal justice issues. Journal of Forensic nursing. 2005; 1(1):28-34, 19.
19. **Jones JS, Dunnuck C, Rossman L, Wynn BN, Nelson-Horan C.** Significance of toluidine blue positive findings after speculum examination for sexual assault. The Am. J of Em. Medicine 2004; 22(3):201-3.
20. **Ramsthaler F, Kettner M, Potente S, Gehl A, Kreutz K, Verhoff MA.** Original oder manipuliert? Rechtsmedizin. 2010; 20(5):385-92.
21. **Albrecht UV, von Jan U, Kuebler J, Zoeller C, Lacher M, Muensterer OJ, et al.** Google Glass for documentation of medical findings: evaluation in forensic medicine. Journal of Medical Internet research. 2014; 16(2): e53.
22. **West MH, Barsley RE, Hall JE, Hayne S, Cimrmancic M.** The detection and documentation of trace wound patterns by use of an alternative light source. Journal of Forensic Sciences 1992; 37(6):1480-8.
23. **Barsley RE, West MH, Fair JA.** Forensic Photography: Ultraviolet Imaging of Wounds on Skin. The American journal of forensic medicine and pathology. 1990; 11(4):300-8.