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## Forensic photography: Prospect through the lens

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### Abstract

Forensic photography is an indispensable tool in modern forensic odontological protocol which aids in investigative procedures, maintenance of archival data, and to provide evidence that can supplement medico legal issues in court. Proper selection and implementation of the appropriate photography and computer equipment combined with necessary training and correct workflow patterns make incorporating photography into the field of forensics, an easily obtainable goal. The role of the forensic photographer is crucial, as a good skill in photography with updated knowledge of the mechanics and techniques involved is required for proper documentation of evidence. This paper aims to shed light on the various aspects of forensic photography with emphasis on its diverse applications and advancements.

**Keywords:** Crime scene, digital single-lens reflex, Forensic photography

### Introduction

Forensic photography is an essential technique used in the field of forensic odontology that plays an important role in crime investigations as well as in medicolegal issues which is also known as “crime scene photography.”<sup>[1]</sup> Main significance of photography in forensic odontology is that it is economical and provides evidence at a faster rate.<sup>[2]</sup>

The word photography is taken from a Greek word “PHOTOS” meaning “LIGHT” and GRAPHOS which means “WRITE.”<sup>[2]</sup> Forensic photography was introduced in 1851 in Belgium and became an advanced technology in the 1870s. New technologies have stretched out its use ever since.<sup>[3]</sup> Photography is useful to assess an object's position and location and its relation with respect to other objects which is difficult or impossible to explain in its entirety. Photographs of the crime scene were able to furnish the desired explanation for many cases.

Every photograph taken in a crime scene can be called into court as physical evidence; hence, the crime scene photographer should have adequate knowledge of mechanics and technical skills for proper documentation of evidence. This paper highlights basic mechanical aspects that the forensic photographer should be concerned with, to gain clear and focused photographs.

## Principles and Procedures of Forensic Photography

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There are certain rules to be followed to obtain proper photographs of the crime scene. They are:

- Securing the scene: After the crime has been established, the scene should be secured as it is, any reallocation in the scene photographed will act as wrong evidence
- Evaluating conditions: Conditions such as light and weather should be evaluated, and camera settings should be adjusted accordingly
- Shooting the scene: Photographer should capture the entire scene using wide-angle shots followed by close up shots to visualize the full scene to show relationship of the evidence to the overall scene
- Photographing the victims: While photographing the victims, location, injuries, and condition of victims should be highlighted
- Photographing the evidence: Photographs should be taken directly at right angles, eliminating probable distance distortions for clear visualization and each part of evidence should be photographed with scale to signify size and without scale to show relationship with overall scene
- Placing evidence markers: First shot of entire crime scene is very essential to confirm that no one has altered with the crime scene. Photographer should capture the scene with and without the evidence markers
- Use of special imaging techniques: Alternate light sources such as lasers, blue or green lights, and colored filters should be used to detect fingerprints, bite marks, and footprints.[4]

## Capturing the Image

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Certain factors are necessary to yield proper photographs. They are:

- Shutter
- Aperture
- Camera International Standards Organisation (ISO)
- Flash or external light source
- Depth of the field
- Exposure
  - Shutter: The shutter determines the amount of time the light is allowed to fall on the digital sensor. A fast shutter speed freezes moving object that helps as to visualize its position at any given moment and slower shutter speed results in blurring and emphasize the moving object[5]
  - Aperture: It is a size of lens opening that controls the brightness of light necessary to capture an image. Representing size of aperture is done by its f-number or f-stop. F 2.8 shows maximum aperture and f 32 shows minimum aperture[6]
  - Camera ISO: It is an international standard that indicates the sensitivity of a sensor denoted by a numerical value. ISO sensitivity depends on light. Lesser light with higher ISO sensitivity is needed to make a proper exposure[7]
  - Flash or external light source: It produces an instantaneous flash of artificial light that helps to light up a subject[8]

- The depth of field: It is the amount of area in front of (foreground) and behind (background) an object that remains in focus. Larger the aperture, less the depth of field and smaller the aperture, more the depth of field[9]
- Proper exposure: It measures the amount of light falling on a subject or the amount of light emitted or reflected by a subject. It is measured by exposure meter.
  - Greatly overexposed images are difficult to produce and can be corrected by closing up the diaphragm (f-stop) and accelerating the shutter
  - Badly underexposed images do not show any mark of background shadiness which should be corrected by unlocking the diaphragm (f-stop) from f 5.6 to f 4 and slowing the shutter speed down from 1/250–1/125.[10,11]

## Basic Equipment for Crime Scene Photography

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Camera-DSLR having 12 MP or higher pixels with Pop-Up Flash, Hot-shoe, and Compact Flash Card/Secure Digital Card is most recommended photography equipment.

- Normal lens
- Wide angle lens
- Close-up lenses or accessories
- Filters
- Electronic flash(s)
- Remote or sync cord for electronic flash(s)
- Extra camera and flash batteries
- Locking cable release
- Tripod
- Film
- Owner's manuals for camera and flash
- Notebook and pen
- Ruler
- Gray card
- Index cards, felt pen
- Flashlight.[12]

## Photographing Specific Crime Scenes

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### Fingerprints

- For photographing fingerprints, equipment required is: 35 mm cameras with macro or close-up lens along with its attachments and Gray card for proper exposures
- Black and white films are more preferred for well-detailed fingerprints because of its more contrast which can be also used for latent print photography.

## Specific types of fingerprint subjects

1. Photographing fingerprints in soft substances such as dust, wax, clay grease should be done at an oblique angle with an adequate cross light followed by glancing illumination with the flashlight[13]
2. In case of porous surfaces, photographs should be captured at a 90° angulation with proper illumination by flashlight
3. Fingerprints on glass and mirrors must be captured using low oblique light angle by placing white card or cloth behind them and a scale for measurement[14]
4. For perspiration prints on glass, transmitted light or backlighting with diffusion screen should be used.

## Impressions

In case of footprints and tire tracks

1. Orientation photograph is first and foremost step to be taken to provide an exact location of impression in the scene
2. Close-up shots must be done with a scale placed on the same plane as the impression and is photographed using strong light from different angles to show the finest detail of an impression[15]
3. Tire impressions are photographed by placing tape measure on the same plane as the impression to show exact circumference of the tire.[16]

## Assaults, injuries

### Bite marks

1. Orientation photograph shows the location of impression in the scene
2. Close-up photograph using scale on the same plane as the impression should be taken at different angles to show the finest detail of the impression.[12,17]

## Photographic Documentation

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Forensic photography is essential to document the physical evidence and to handle it in a correct way which later on can be called up in court.

### Procedure for proper documentation

Main steps necessary for proper documentation are:

1. Photograph to be taken in daylight or with background lighting
2. Date and Scale of reference – Photographing the injury with and without evidence ruler and dates to be done
3. Identification of person photographed is important as it is needed to prove it in court
4. Establish authenticity – Two elements necessary to establish authenticity are: First is to record every process done from capturing the image to presentation in court and second is to protect the captured image with brands to prove that it is authentic
5. Chain of evidence (COE) procedure – In COE procedure, origin, usage, storage, and processing of evidence with its integrity is clearly documented

6. Storage of images – Captured images should transfer to in any case to CD-R. It should be stored in a cupboard with limited access
7. Protecting photographic evidence – Photographs reserved in a computer should be protected with password with limited access. Special hard disks can also be used for storing images.[18]

## Conclusion

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Forensic photography creates a permanent visual record of the crime scene in the state in which it was originally found and plays a huge role throughout the entire investigation. It also plays a beneficial role in reconstructing the events which took place and give jurors a clear image of the crime.[2]

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