

Reconsidering the conventional reconstruction mechanism of a crime scene: Exploring forensic photography

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Abstract: The prosecutors, defence attorneys and magistrates involved in the litigation process of a crime do not have the opportunity to be at the crime scene. Therefore, recording and documenting the crime scene permits the court of law to have a true reflection of the crime scene in a small and manageable size. This takes place in various forms, such as the taking of crime scene photographs, a plan drawn according to scale (or a rough sketch and sketch plan), the taking of notes, and even video recordings of the crime scene – either in three dimensions (3D) or using a hand-held video camera.

The purpose of this article is to explore how detectives and crime scene technicians (CSTs) are currently conducting crime scene reconstructions of murder crime scenes by adopting forensic photography, and how forensic photography could be used for this purpose. To increase understanding of the phenomenon, qualitative research driven by an empirical design was used to collect data from police detectives in the Durban area of policing.

The findings suggest that detectives and crime scene technicians are not doing everything in their power to use forensic photography to reconstruct crime scenes. The researchers therefore recommend that the South African Police Service's (SAPS) detectives and crime scene technicians adopt the fundamentals of forensic photography when reconstructing murder crime scenes. The SAPS detectives and crime scene technicians should also attend extensive training and be provided with sufficient resources. The article's findings and recommendations reply to the questions of the legal and criminal justice fraternity about true reflections of what transpired during the commission of a crime.

Keywords: crime scene investigations, reconstruction, forensic science, forensic photography, three-dimensional (3D)

Introduction

The conceptual framework of this article focuses on crime scene investigations, crime scene reconstructions, forensic science, forensic photography, and the three-dimensional (3D) portrayal of crime scenes, which have previously been investigated by Mokwena and Makola (2023), Mokwena and Motsepe (2020) regard photography as investigators guide and silent witness, Mokwena (2012) say the significance crime scene photographs as data capturing technique, and again, Singh (2018) state that photogrammetry is the future of the forensic investigation. These concepts were used interchangeably in the discussions, as they form critical parts of a crime scene investigation. Brown and Davenport (2012:7) state that forensic science begins at the crime scene – the place where an incident took place.

Documentation of the crime scene is the most critical element of scene processing. Competent documentation is necessary for justification in a court of law. Documenting the conditions of the scene is a fundamental element of acquiring clear facts as to what occurred and what did not occur at a crime scene. It may be impossible for detectives and crime scene technicians (CSTs) to arrive at a conclusion on a murder case, without appropriate documentation (Gardner and Krouskup, 2018:107)

James and Nordby (2013) further emphasise that documenting a crime scene is the most important step in the processing of a crime scene. The main purpose of documenting a crime scene is to record the condition of the scene and its physical evidence. According to Lee, Palmbach and Miller (2001), documenting a crime scene is “the most time-consuming activity at the scene and requires the investigator to remain organised and systematic throughout the whole process”.

Because of differences in crime scenes, there are distinct, set standards for detectives and CSTs to follow when documenting a crime scene. For instance, a murder crime scene will be different from a house robbery crime scene. The knowledge about documenting a crime scene has been constructed by different experts in the field and new ways of documenting crime scenes and physical evidence keep evolving. Numerous methods can be used in documenting the crime scene, namely:

- **The use of photographs**
The main purpose of the use of photographs at a crime scene is to capture evidence and for the detectives and CSTs to assist the prosecutor to reproduce events in a court of law. The crime scene should be photographed from long, medium and close-range vantage points. Each stage of the commission of the crime should be treated and photographed separately (Moreau,1995).
- **Video recording**
Miller and Massy (2018:38) mention that “videography is the virtual reality format of crime scene documentation”. Video recordings should be taken immediately, as the police official or investigator inspects the crime scene. The police official and investigator making use of the video recording should start recording all the information and objects displaced at the location of the crime scene:
- **Notes**
Taking notes at a crime scene is beneficial, because it forces crime scene police officers to record any evidence and the state of the location, as it was found (Byrd & Sutton, 2012:58). The researchers have observed that note-taking does not only assist with record-keeping, but also with the following:
 - Providing the police official /investigator with credibility, not only to his superiors but also in the courtroom. Note-taking also refreshes the memory.
 - Note-taking ensures proper administration of the criminal justice system by facilitating the proof of facts.
- **Sketches**
The crime scene sketch is a measured drawing of a scene, showing the location of all the important items, particularly physical evidence (Gilbert, 2001: 98). Most importantly, as emphasised by Marais and Van Rooyen (1990:44), the sketch must be accurate and correspond with the witnesses’ statements and plans.


None of the methods used in documenting a crime scene is superior to any other. Each should be followed systematically and in an organised manner (Lochner & Zinn, 2015). The researchers believe that the importance of proper crime scene documenting has been underestimated in South Africa – it seems that this step is somewhat ignored. Between the years 2011 and 2020 there has been an increase in murder cases. In the financial year 2010/2011, a total of 15 893 murder cases were recorded. This increased to 21 325 in the financial year 2019/20, which is a total increase of 1,4% in the murder rate over a period of 8 years (South African Police Service, 2020). Figure 1 below depicts the increase in murders in the KwaZulu-Natal province – an increase of 10.6% from the financial years 2010/2011 to 2019/2020. Most concerning, figure 2 shows that of the reported cases, only 81% led to a conviction. The researchers note that 81% is a high conviction rate, but considering the high murder figures, there are still thousands of murder cases that are not concluded, especially because very few cases end up in court for prosecution in the first place.

It might be worth pointing out the low prosecution rates as reported :

<https://www.news24.com/citypress/news/rising-crime-low-prosecution-rates-how-law-enforcement-in-sa-has-all-but-collapsed-20191021>;

<https://businesstech.co.za/news/lifestyle/677737/getting-away-with-murder-in-south-africa/>

This goes back to the importance of appropriate documentation of crime scenes. The first rule to follow on a crime scene is still not to destroy the scene, including not to contaminate the scene (Miller & Massay, 2018:45).



CRIME CATEGORY	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	Case Diff	% Change
CONTACT CRIMES (CRIMES AGAINST THE PERSON)												
Murder	3 740	3 418	3 623	3 616	3 810	3 929	4 014	4 382	4 395	4 859	464	10,6%

Figure 1: Kwazulu-Natal crime situation
 Source: South African Police Service (2020)

KwaZulu-Natal Division

Financial year	FY212 Actual performance	FY223 Actual performance	FY234 Actual performance
Conviction rate in high courts	93.3% = 56/60	85.7% = 78/91	89.6% = 95/106
Conviction rate in regional courts	80.2% = 1 835/2 287	79.1% = 2 481/3 137	80.4% = 2 280/2 836
Conviction rate in district courts	96.5% = 16 555/17 150	94.6% = 17 506/18 513	95% = 20 118/21 183
Conviction rate in murder prosecutions	80.9% = 411/508 Cases	75.3% = 577/766 Cases	81% = 608/751 Cases
Conviction rate in femicide prosecutions	96.9% = 31/32 Counts	89.2% = 66/74 Counts	94.8% = 91/96 Counts
Conviction rate in murder intimate partner femicide prosecutions	96.4% = 27/28 Counts	92.9% = 65/70 Counts	98.6% = 70/71 Counts

Figure 2: Conviction rates of murder cases in the KZN province
 Source: National Prosecuting Authority (NPA) (2023)

As indicated above, the most important aspect of documenting a crime scene is to preserve the scene with minimal disturbance of what was found. As a general practice, the first police officer to arrive at the crime scene should make notes of the time, date, location and individuals involved. Immediately upon arrival, the police officer should ensure the safety and well-being of victims and witnesses, by identifying and controlling any dangerous situations (Miller & Massay, 2018:45).

For the purposes of this paper, the researchers focused on the adoption of forensic photography and how it could be used by detectives and crime scene technicians (CSTs) to conduct crime scene reconstructions in murder cases.

Research methodology

A qualitative research method was used for this research, to gain an understanding of the importance of using forensic photography in the reconstruction of murder cases in the Durban policing area. Creswell (2014:27) states that qualitative research begins with assumptions and the use of interpretive and theoretical frameworks, which inform the study or research problems and address the meaning that individuals or groups ascribe to a social or human problem/phenomenon. Creswell (2007) further emphasises that the qualitative approach is especially beneficial in the generation of categories for understanding human phenomena and the investigation of the interpretation of, and meaning that people give to events and experiences.

A qualitative research method, based on an empirical design, was therefore adopted to collect data from police detectives in the Durban policing area to explore the evidentiary value of forensic photography in criminal investigations.

The evidentiary value of forensic photography in criminal investigations

“A picture is worth a thousand words, and it is especially true in crime scene photography” (Rohatgi & Kapoor, 2014). The role played by crime scene photography is undoubtedly of significant value (Mokwena, 2012:55). Where photographs have adequate information, it will eliminate the need for the court to conduct an inspection *in loco*, and furthermore, there will be no need for the witnesses to elaborate on the issue demonstrated in the photographs.

The complete and precise photographic documentation of crime scenes is the foundation of any criminal investigation. Photographs provide a significant link between evidence recovery at a crime scene and the context in which the evidence was found. These pieces of photographic evidence are extremely helpful in a courtroom by assisting detectives to describe a crime scene and tell their story. In addition, the systematic and complete photographic recording of all aspects of an investigation helps to fill the gap between the pieces of evidence found at a crime scene and the processing thereof (Duncan, 2023).

Forensic photography was developed to provide a visual record of the crime scene and related areas, to record the initial appearance of the crime scene and physical evidence, to provide detectives, CSTs and others with a lasting record for subsequent analysis of the scene, and to provide a permanent record for the courts. This places an enormous burden on detectives to ensure that the documentation is done properly (Miller & Massay, 2018:45).

The purpose of crime scene photographs

Miller and Massay (2018:45) explain that crime scene photographs are used to support and enhance the understanding of the scene and the investigation report. They should graphically capture:

- the condition of the overall scene
- the location
- the orientation
- if possible, the spatial relationships of different areas in the scene to one another, as well as to the various items of evidence found at the scene
- the essential detail of the precise items found at the crime scene

Indeed, Orthmann and Hess (2013:50) elaborate that to reconstruct the entire crime scene, detectives and CSTs must take sufficient photographs. Fisher (2004:79) in Singh (2016:60) explains that forensic photography entails the recording and documenting of items of physical evidence found at the crime scene, using a camera, in the same setting or conditions in which they were found by the investigator.

The limitations of crime scene photography

According to Duncan (2023), detectives and CSTs should have a determined and restless personality. They must have an eye for detail and a passion to be a lifelong learner.

However, documenting a crime scene using photography has two limitations. Firstly, the camera itself. Cameras cannot create the same view that the human eye sees, and the settings of the camera can alter what can or cannot be seen in a photograph. A trained detective and CST will easily recognise difficult lighting situations and adjust the camera's settings accordingly. Often, more than one photo should be taken of the same view and same angle, in order to properly expose varying conditions of a single view. Secondly, critical thinking skills and analysis are constantly applied during the scene documentation process. An inexperienced detective will often forget to review the process and erroneously rely on their camera to “make the right decisions” (Rohatgi and Kapoor, 2014:271).

According to the South African Police Service (2014), upon recruitment, their recruits are police trainees who will undergo the Basic Police Development Learning Programme. The learning programme equips the police officials to

- use a series of legal and policing skills and serve members in communities in accordance with the Constitution of South Africa
- provide an operative service that will improve community satisfaction and position them to fulfil their mission of creating a safe and secure environment for all who live in South Africa

The learning programme arose from a Western Cape courts situation, where 200 cases had to be withdrawn owing to police inefficiencies and incomplete investigations (Gontsana, 2022). Proper use of forensic photography can provide effective records of evidence and assist the prosecutor in the courtroom. Thorough training in the use of cameras is essential for all detectives and CSTs.

The use of three-dimensional recording techniques in crime scenes

The three-dimensional recreation of crime scenes is critical for law enforcement and the investigation of serious crimes for criminal justice responses (Maneli & Isafiade, 2022).

The use of three-dimensional laser scanners is on the rise, as detectives and CSTs are increasingly adopting this technology. Three-dimensional scanners record information that will endure public and legal scrutiny, while bringing justice to the victims. Three-dimensional laser technology is used to accurately represent every aspect of each piece of evidence (GIM International, 2020). Three-dimensional scanning systems have the power to bring a crime scene into the courtroom through photorealistic 3D models using methodical, scientific approaches.

The technology allows detectives and CSTs to collect and record detailed dimensions, evidence and features for later analysis (GIM International, 2020). In fact, the use of three-dimensional laser scanning for the analysis of crime scenes has been developed to such an extent that evidence obtained through this method is expected and required for any formal investigation process (Webber-Youngman et al., 2019).

GIM International (2020) emphasises that part of the value of using 3D scanners to investigate crimes is that evidence can be documented, analysed and processed later, as needed. Besides enabling investigators to clear a scene more quickly, this is also useful if new evidence surfaces or if suspects change their stories.

The use of forensic photography in the reconstruction of murder crime scenes

Investigative responsibilities during preliminary crime scene investigation include the questioning of witnesses and suspected suspects; searching the scene for evidence, photographing, videotaping and sketching the murder scene; and recording all statements and observations in notes which will be used for future investigation and prosecution of the case (Orthmann & Hess, 2013:19). According to Ogle (2004:256), crime scene reconstruction is based on physical evidence such as bloodstain pattern evidence, firearm evidence and other types of physical evidence. Photography pre-eminently records such physical evidence.

The latest advancements of science in allying ultraviolet (UV) rays and infrared (IR) with photography have opened enormous possibilities in criminal investigation (Rohatgi and Kapoor, 2014:271).

Photogrammetry as a crime scene reconstruction technique

According to Bila (2018:322); and James and Nordby (2014:182), crime scene reconstruction is the process of analysing, determining, or eliminating the events that could have taken place at the scene of the crime incident by considering factors such as the crime scene appearance, location and position of the physical evidence, and the forensic laboratory examination of the physical evidence. Additionally, Fish, Miller, Braswell & Wallace. (2013:82) indicate that the primary goal of crime scene investigation is to reconstruct the sequence of events leading to the occurrence of a crime and to identify the movements of its perpetrators, victims and witnesses; as well as the location of evidence.

The South African Police Service (2006:15) stipulates that the crime scene technician should ensure the recording of the crime scene before it is altered or contaminated in any way. All physical evidence is recorded in its original position and the condition of the scene should also be recorded after the conclusion of the process. Gardner (2012:183) regard the scientific method is the foundation of crime reconstruction processes. According to the ballistic expert referred to in chapter 3, crime scene reconstruction is an event reconstruction, based on the fact that the ultimate goal is to place all physical evidence at the crime incident in order to have a clear view of *how* the particular incident occurred.

The ballistic expert added further that the scene of the crime is reconstructed by analysing the sequence of events in the reverse order, in terms of which the investigator starts from the end of an incident and ends where it began with the assistance of photography. By viewing the photographs of the crime scene, the investigator will be able to place relevant evidence marks in their proper crime scene locations (Zinn & Dintwe, 2015:49). According to James and Nordby (2014:182), the scientific process of crime scene reconstruction involves of the following actions or stages, namely:

- **Conjecture:** There should be a possible explanation of action involved in the crime before any detailed analysis of the evidence is accomplished;
- **Data collection:** All crime scene documentation obtained from the victim, perpetrator, including physical evidence, patterns and impressions are studied;

- **Hypotheses formulation:** Additional data accumulation is based on the examination of physical evidence and the continuing investigation;
- **Testing:** Once a hypothesis is developed, additional testing or experimentation should be undertaken to confirm or disprove the overall specific aspects or interpretation of the hypothesis.
- **Theory formulation:** Additional information may be obtained during the investigation concerning the victim's or suspect's condition, the activities of the individuals involved, accuracy of witness accounts and other information about the circumstances of the incident. When the hypothesis has been adequately tested and verified analytically, a reconstruction theory could then be generated by investigators (Fisher & Fisher, 2012:5).

Crime scene reconstruction involves the evaluation of the context of a scene and the physical evidence found there in an effort to identify *what* actually transpired, and in *what* order (Gardner & Bevel, 2009:1); and (Lushbaugh & Weston, 2012:80). Furthermore, such reconstruction plays an important role during the further investigation phase, as it validates and reverses the preliminary investigation phase version. This technique (reverse reconstruction) assists detectives, criminal investigators and the court to determine the reliability of information relative to solving the case (Fisher & Fisher, 2012:5); and (Gardner & Bevel, 2009:1). Further investigation is a complex multiple process that includes photography. Proper analysis of crime scene photographs is likely to play a prominent role in crime scene reconstruction.

Photogrammetry contributes accurately and reliably measured physical evidence (James & Nordby, 2014:182). Although some individuals would have witnessed an event by confirming their observation, which is very important for the judicial process, such confirmation substantiates the facts about the event; which is more helpful than relying on a single set of evidence and reaching a hypothetically drawn conclusion. Therefore, it is essential to verify witnesses' statements for credibility purposes (James & Nordby, 2014:182 and Mokwena & Motsepe, 2020).

The purpose of crime scene reconstruction

James and Nordby (2005:180) clearly state that crime scene reconstruction encompasses scientific crime scene investigation, construal of patterned evidence at the scene, laboratory testing of the physical evidence, and a systematic study of related case data, in order to form a logical theory. This is not only limited to crime scenes where a preliminary investigation was not conducted, but applies to all crime scenes – documented or not. Hueske (2006:9) states that the ultimate objective of crime scene reconstruction in general is to riposte *who, what, when, how* and *why* questions. Jackson and Jackson (2011:6) suggest that the partial or complete reconstruction of a crime may be very important in corroborating or refuting an account of events given by suspects and eyewitnesses. Ogle (2004:251) comments that crime scene reconstruction often affords the investigator with the ability to determine which versions of the events at a crime scene received from individuals at the scene are more appropriate, and which are likely to be incorrect. Ogle (2004:251) adds that the elements of the crime may frequently be established through a reconstruction of the events at the crime scene, and that crime scene investigation can determine whether the death is a result of suicide, accident or murder. The purpose of crime scene reconstruction refers to determining how a crime was committed by interviewing witnesses, analysing evidence, and analysing the crime scene (Osman, Gabriel & Hamzah, 2021:3).

The use of forensic photography to reconstruct murder crime scene

Ogle (2004:256) states that crime scene reconstruction is based on physical evidence such as bloodstain pattern evidence, firearm evidence and other types of physical evidence. For the purpose of this article the researcher will only focus on aspects in which forensic photography is used in the reconstruction process of murder crime scenes, and not on any other processes involved in the reconstruction process – for example, bloodstain patterns and firearm evidence.

Bloodstain patterns

Gardner and Bevel (2009:107) define bloodstain pattern analysis as in-depth evaluation of the physical bloodstains at the scene and on associated objects. James and Nordby (2009:188) state that photographs are used to document and capture bloodstain patterns found on crime scenes. James and Nordby (2009:188) are supported by Orthmann and Hess (2013:51), who maintain that close-up photographs must be taken of bloodstains. These photographs are then used to conduct bloodstain pattern analysis, and determine which bloodstain pattern was present on the crime scene.

Ogle (2004:265), James and Nordby (2009:249) and Orthmann and Hess (2013:156) agrees that bloodstains not visible to the eye, and treated with luminol and Bluestar, must be photographed in order to determine the bloodspatter pattern.

Firearm evidence

Ogle (2004:256) stated that most crime scene reconstructions based on firearm evidence involve murders, and that the firearm evidence in reconstructions includes discharge residues, trajectories, weapon functionality, and locations of expended cartridges. Gardner and Bevel (2009:161) inform that lasers are often used in place of trajectory rods: the laser line is aligned with multiple defects, and then photographed.

Findings

The article highlights that detectives and CSTs do not take forensic photography into sufficient consideration during their preliminary investigations of crimes. This could be because of inefficient training and/or a lack of resources within the South African Police Service (SAPS). The article emphasises the importance of forensic photography in providing the legal and criminal justice fraternity with a true reflection of what transpired during the commission of a crime.

Conclusion and recommendation

The Durban policing area has been listed as one of the cities with the highest number of murder cases in South Africa. The success of prosecution and conviction relies entirely on the proper documentation of the crime scene during the crime scene investigation. Based on their findings, the researchers recommend the following:

- Detectives and CSTs should be provided with comprehensive training in forensic science and the use and importance of forensic photography in the reconstruction of crime scenes.
- Detectives and CSTs should be provided with sufficient resources.
Detectives and CSTs should focus on using forensic photography effectively to increase prosecution rates in the Durban policing area

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