Journal of Law and Judicial System
Volume 2, Issue 3, 2019, PP 18-22
ISSN 2637-5893 (Online)

Blood in Murder Investigation

Siniša Franjić*

Faculty of Law, International University of Brcko District, Brcko, Bosnia And Herzegovina, Europe

***Corresponding Author:** Siniša Franjić, Faculty of Law, International University of Brcko District, Brcko, Bosnia And Herzegovina, Europe, E-mail: sinisa.franjic@gmail.com*

ABSTRACT

Finding and correctly interpreting blood traces can be of utmost importance in solving the circumstances surrounding the perpetration of the crime, the actions of the victim and the perpetrator at the scene, their contribution to the perpetration of the crime, their behavior after the perpetration of the crime. Unless the perpetrator is not known in the first stages of criminal investigation, blood traces, together with other material traces at the scene, can be a significant controlling factor in assessing the credibility and truthfulness of the statements of the event participants. In criminal and judicial practice, cases have been reported in which a thorough qualitative and quantitative analysis of traces of the blood was crucial for identifying the perpetrators, participants, as well as proving their role in the perpetration of the crime.

Keywords: *Blood, Evidence, Pattern, DNA*

INTRODUCTION

The first few minutes of a crime scene's processing can be the most critical moments of an entire investigation [1]. At no other period will the investigators be closer to the moment the crime was committed. Investigators will never have the area more pristine or more unfettered from contamination. In those first few minutes, fingerprints, shoe prints, tire prints, trace evidence, and the state of the victim are all at their most informative. And yet, at no other time are mistakes more likely made that can potentially jeopardize successful prosecution of the crime's perpetrator.

Crime scene processing is an inherent task and duty associated with most criminal investigations, for rarely does one encounter a crime without some kind of crime scene [2]. Crime scene processing consists of an examination and evaluation of the scene for the express purpose of recovering physical evidence and documenting the scene's condition in situ, or as found. To accomplish this, the crime scene technician engages in six basic steps: assessing, observing, documenting, searching, collecting, and analyzing. These steps, and the order in which they are accomplished, are neither arbitrary nor random. Each serves an underlying purpose in capturing scene context and recovering evidence without degrading the value of either. Any way you look at it, this is not an easy task, since the mere act of processing the scene disturbs the scene and evidence. From these efforts however, the investigator will walk away with important items of physical evidence and scene documentation in the form of sketches, photographs, notes, and reports. All of this information plays a significant role in resolving crime by providing objective data on which the investigating team can test investigative theories, corroborate or refute testimonial evidence, and ultimately demonstrate to the court the conditions and circumstances defined by the scene. This is a task that is easily said, but it is not so easily done.

Action without purpose is folly and, simply put, becomes wasted effort. This is true in any endeavor, so it is imperative that before pursuing the actions an investigator conducts in the crime scene, the investigator must understand his or her mandate. Crime scene processing is a duty in every sense of the word. Crime scene processing is not something the technicians do because "they were told to," but rather because they have a responsibility to do so. If the investigator fails to recognize this duty and its ultimate purpose, many of the procedures used at the scene might appear meaningless and therefore unnecessary.

EVIDENCE

Evidence is anything that can be used to probe the events and identify the participants of a crime [1]. Investigators gather two types of evidence during an investigation, direct and

circumstantial. Direct evidence refers to information gathered from statements made by a surviving victim, by suspects, and by eyewitnesses. This type of evidence, however, is notoriously unreliable. Perceptions of an event, as they pass from the eyes to the brain to the vocal chords, can be filtered and distorted in a number of ways. The accuracy of a person's account is subject to filtration by the witness' own visual acuity and is susceptible to distortion as it's refracted through the powerful lens of their bias, prejudice, and past experience. An eyewitness account is also vulnerable to flaws in continuity through the witness' own capacity, or lack thereof, for accurately remembering information and the order in which the events of the crime occurred.

Circumstantial evidence usually refers to items such as blood, fingerprints, hair, fibers, and DNA. This type of evidence is more amenable to scientific examination than is direct evidence. And, since various controls can be run with any type of scientific test designed to identify its source, circumstantial evidence tends to be more reliable. Nevertheless, circumstantial evidence still requires that a court make a judgment as to its relevance. For example, if DNA analysis shows that a suspect's blood was found at the scene of a murder, a jury still must weigh the arguments made that such evidence necessarily places the suspect at the scene during the time the crime was committed.

But what types of evidence should be collected, and how much of any one type? If a murder, assault, or burglary is being investigated, any type of evidence that can place a suspect at the scene should be collected. This is usually obvious; fingerprints, a murder weapon, bloodstains, and shoeprints can all be critical to solving a crime. Not so obvious, however, might be those items not readily visible, such things as dirt, pollen, hair, and fibers. These items of trace evidence might prove that the perpetrator came from a certain outside geographical region having a unique flora and geology. Collecting absolutely everything from a crime scene, from a couch down to the dust, however, would create a documentation and storage nightmare and might actually hinder speedy and successful prosecution of the case. Experience becomes the best teacher as to what items will have the most relevance for the investigation of each type of crime.

At the crime scene, the perpetrator may leave traces that may be visible or invisible [3]. When securing the scene, care should be taken not to destroy or alter the tracks or to create new ones. Traces can appear as papillary prints, footprints, traces of fibers from clothing, traces of blood, traces of teeth if the offender consumed food at the scene. During the course of the examination, it is necessary to inspect the vicinity of the scene, as there is a possibility that the perpetrator, upon arriving at and leaving the crime scene after the burglary, left traces to identify him or indicate his movement, hid the stolen objects or discarded used tools.

BLOOD

Saliva is sprayed, hair is yanked from its roots, skin is scraped off, and flesh is torn [1]. Violent crime inevitably leaves a number of different types of biological materials behind as witness to the attack. With the possible exception of semen in the case of sexual assault, no type of biological fluid or tissue is consistently more revealing about the victim, the attacker, and the circumstances of the assault than blood. Blood can yield DNA that identifies the crime's participants. Its splash patterns can reveal the site and mode of the attack. Blood can make an attacker's fingerprints or shoeprints readily visible.

We can all recognize a bloodstain. If it's fresh, it's red. Older bloodstains are a reddish brown. But not all stains having the color of blood are blood. A number of liquids such as paint, rusty water, food coloring, salsa, and catsup can give the appearance of blood. Upon finding a suspicious-looking stain at a crime scene, a forensic scientist will need to make a determination as to whether or not it is really blood. This is done by performing a presumptive test, so called because, if the test is positive, the investigator can presume the stain is actually blood.

Most presumptive tests for blood show a positive result by changing color when exposed to hemoglobin, the iron-containing protein in red blood cells responsible for carrying oxygen from the lungs to the rest of the body. Unfortunately, some plants, such as horseradish and potatoes, contain enzymes that can also induce a color change during a presumptive test for blood. If these should be present at a crime scene, they could lead to a false-positive result. Nevertheless, these occasions are rare and the presumptive tests used by forensic scientists are reliable enough to have value. They almost all rely on a chemical process called oxidation–reduction.

Blood Types

Blood typing has been used for many years in forensic science and was the main source of

blood determinations prior to deoxyribonucleic acid (DNA) being introduced as a more conclusive form of evidence [4]. Four main blood types are used for identification purposes, but there are eight groups, which are more specific and relate directly to the antigen present in the blood. In addition, the basic A-antigen and B-antigen in an individual's blood will also contain the presence of an Rh factor of positive or negative.

The four blood types are:

- A
- B
- AB
- O

Once human blood is identified at a crime scene, the specific blood type can be determined. Unfortunately, this is not individualized to a specific person but helps narrow the percentage of the population that has that specific blood type. If blood typing is the only option in a case, the investigator could narrow the suspect pool by determining the blood type found at the crime scene and comparing the information to the blood type of each possible suspect.

Blood Identification

The most characteristic feature of blood is hemoglobin, and forensic tests for blood are based on detecting hemoglobin or its components [5]. Hemoglobin is the protein that transports oxygen between the lungs and all the tissues and cells of the body. Hemoglobin consists of two parts, "heme" (which carries the oxygen) and "globin" (the protein portion). The preliminary forensic blood identification tests are really tests for heme. They use certain dye substances that, when mixed with peroxide, will change color in a chemical reaction called "oxidation." There are protein enzymes in nature that will speed up this reaction, but heme will also speed up the reaction. Remember that enzymes are catalysts; they speed up reactions that are otherwise slow. Likewise, heme is acting like a catalyst in this reaction, so forensic scientists call these tests "catalytic." They have been used for well over 100 years. A number of different dye substances work, several of which are commonly used in forensic science laboratories. They are orthotolidine, phenolphthalin, leucomalachite green, and tetramethylbenzidine. Made up in the proper solutions, these chemicals change color in a positive test.

Bloodstain Patterns

Bloodstain pattern analysis is a powerful forensic tool used in crime scene investigations [6]. If the investigator understands the dynamics of an altercation, how blood behaves when it exits the body, and how it reacts when it contacts a surface, then an attempt can be made to understand what happened and to determine if a crime occurred. The trained forensic scientist looks at the patterns made by bloodshed and tries to determine what did and/or did not happen. Interpreting the bloodstain patterns involves physical measurement of blood droplets, pattern recognition using known photographs or experiments, the use of trigonometry, and knowledge of the physics of motion. Together with other types of evidence from the crime scene (such as fingerprints, tool mark and footprint impressions, DNA evidence, and chemical analysis), the forensic investigator pieces together the puzzle recreating a logical sequence of events, supported by crime scene evidence. Collecting and documenting the evidence correctly is another skill just as important as interpreting evidence. Bloodstains cannot always be carried back to the lab, so care in documenting the scene is of utmost importance. Photographs and detailed sketches drawn to scale are invaluable tools that help piece together the puzzle.

Crimes involving violent contact between individuals are frequently accompanied by bleeding and resultant bloodstain patterns [7]. Crime-scene analysts have come to appreciate that bloodstain patterns deposited on floors, walls, ceilings, bedding, and other relevant objects can provide valuable insights into events that occurred during the commission of a violent crime. The information one is likely to uncover as a result of bloodstain pattern interpretation includes the following:

- The direction from which blood originated
- The angle at which a blood droplet struck a surface
- The location or position of a victim at the time a bloody wound was inflicted
- The movement of a bleeding individual at the crime scene
- The minimum number of blows that struck a bleeding victim
- The approximate location of an individual delivering blows that produced a bloodstain pattern

While becoming a certified bloodstain pattern analyst requires years of training and practice,

the CSI can learn to examine blood spatter at the crime scene and determine direction of travel and a general location for area of origin of the impact [8]. This understanding is important, because the interpretation of blood spatter patterns and other evidence at crime scenes may reveal important investigative information, such as the positions of the victim, assailant, and objects at the scene; the type of weapon that was used to cause the spatter; the number of blows, shots, stabs, and so on that occurred; and the movement and direction of the victim and assailant after the bloodshed began. It may also support or contradict statements given by victims, suspects, or witnesses, and, most important, may keep an innocent person from being convicted.

Passive bloodstains are created by the force of gravity and can be found on a variety of surfaces, such as carpet, wood, tile, wallpaper, or clothing. A close inspection of the crime scene is required, and all stains must be documented. By applying the law of physics, mathematics, and trigonometry, bloodstain pattern analysis can provide information that will assist the investigator in determining what events occurred, who was or was not present, and the validity of a self-defense claim by the suspected perpetrator.

The crime scene may contain several areas where blood spatter is found. During the initial walkthrough, it is important to consider each location for analysis. In addition to the possible determination of the course and sequence of events, the reconstruction will allow the CSI to develop a plan for the collection of blood samples from the most logical sites after the scene has been documented. There is no need to sample every single blood drop. Careful analysis of the scene will result in accurate representative samples of blood being submitted to the crime laboratory for analysis.

DNA

DNA, that beautiful spiral molecule twisting like the staircase in a lighthouse, carries all the information that was needed to make a complete you [1]. Your gender, the color of your hair, your skin, your eyes, and even the ability, if you have it, to curl your tongue into the shape of a half pipe, you owe all to your DNA and the information it encodes.

In almost every crime of violence—assault, rape, or murder—DNA is left behind as a calling card to the participants of that violence. DNA is in the hair ripped out by an assailant. It's in the semen and saliva from the rapist. It's in the skin trapped under the fingernails of the victim who was trying to defend herself against attack. It's in the drops of blood splashed against the pavement from a gang slaying. It's a silent witness waiting in the bones of the dead and discarded. To get that witness to divulge its secrets, it must first be isolated in a pure form and its amount determined.

DNA is actually two molecules in one. It is double-stranded—made from two strands held together by weak chemical bonds, called hydrogen bonds, between complementary bases. An A base (adenine) on one strand always bonds with its complementary base T (thymine) on the other strand, and a C (cytosine) on one strand always bonds with a G (guanine) on the opposite strand. An A with a T and a C with a G are called base pairs (bp). When a base such as A, C, G, or T is also connected to a phosphate group (a phosphorous atom surrounded by four oxygen atoms) and a ribose sugar, it is called a nucleotide. DNA consists of two nucleotide chains. The hydrogen bonds between those two chains are weak and easily broken by heating or by chemical treatment under the right laboratory conditions.

DOCUMENTATION

Many of the activities in a public forensic science lab can be grouped under the heading of criminalistics [5]. One of these is evidence handling. Some general principles apply to handling and evaluating any kind of evidence. These principles relate to documentation, chain of custody, packaging, preservation, preventing contamination, and safety issues.

Documentation means that there are good records of what an evidence item is and exactly where it came from, as well as sufficient labeling so that it can be tracked from place to place. Items collected at a crime scene may be stored in a police department evidence storage facility, then removed and taken to a laboratory. At the laboratory the items are kept in secure storage facilities except when they are taken out to be analyzed. Following analysis they may be returned to police evidence storage. If the case to which the items relate goes to trial, the evidence is removed from police evidence storage and transferred to court evidence storage. From there it may be removed and taken to the courtroom during the trial, then placed back in storage. Documentation provides ways to track the items through these transfers. There must be sufficient documentation to establish that an item brought into the courtroom

as an exhibit is the same item that police seized at the crime scene or other original location. This process of ensuring that it is the same item is sometimes called the "chain of custody." It amounts to documentation that shows where the item was at all times since its original seizure.

SEARCH

Determine if the police have a legal right to be present conducting the crime scene investigation [9]. A crime scene investigation is basically the search for evidence and properly documenting, preserving, and collecting this evidence. The key word is search; the CSI must ensure that a person's Fourth Amendment rights against unreasonable search and seizure are protected. It is incumbent upon the crime scene investigator to ensure that he or she has legal authority to be present conducting the scene investigation.

The key legal premise to determine is who has a reasonable expectation of privacy in the area where the crime scene investigation is being conducted. This may not necessarily be the titleholder of a piece of property. Lawfully rented property requires the authority of the lawful renter, not necessarily the property owner. A roommate may allow a search, but that authority extends to his or her personal area and any shared area (such as the kitchen and living room); such consent would not extend to his or her roommate's bedroom. Either the individual that has a reasonable expectation of privacy in the area to be searched grants approval, or a judge with appropriate jurisdiction may grant permission to search through a search warrant.

CONCLUSION

Efficient use of blood traces in criminal investigations should rely on the concreted work of at least three organizational forms of competent state bodies; specialized teams involved in the investigation of the scene of the criminal event (criminal technicians, investigators, police, public prosecutor), experts which performing laboratory analyzes of traces and other materials taken from the scene and, of course, experts in the investigation of blood, sexual or other offenses during whose perpetration appearing traces of blood.

REFERENCES

[1] Okuda, M. M.; Stephenson, F. H. (2015.): „A Hands-On Introduction to Forensic Science - Cracking the Case", CRC Press, Taylor & Francis Group, Boca Raton, USA, pp. 9.; 11.; 92.; 143.

[2] Gardner, R. M. (2005.): „Practical Crime Scene Processing and Investigation", CRC Press LLC, Boca Raton, USA, pp. 1.

[3] Pavišić, B.; Modly, D.; Veić, P. (2012.): „Kriminalistika – Knjiga 2 (Criminalistics – Book 2)", Dušević&Kršovnik, Rijeka, Croatia, pp. 218.

[4] Erickson, E. (2014.): „Criminalistics Laboratory Manual - The Basics of Forensic Investigation", Anderson Publishing, Elsevier, Waltham, USA, pp. 143.

[5] Gaensslen, R. E. (2009.): „Blood, Bugs, and Plants", Facts On File, Inc., New York, USA, pp. 75. – 76.; 79. – 80.

[6] Mirakovits, K.; Londino, G. (2016.): „The Basics of Investigating Forensic Science - A Laboratory Manual", CRC Press, Taylor & Francis Group, Boca Raton, USA, pp. 105.

[7] Saferstein, R. (2015.): „Criminalistics - An Introduction to Forensic Science, Eleventh Edition, Global Edition", Pearson Education Limited, Harlow, UK, pp. 95.

[8] Fish, J. T.; Miller, L. S.; Braswell, M. C.; Wallace, jr., E. W. (2014.): „Crime Scene Investigation, Third Edition", Anderson Publishing, Elsevier, Oxford, UK, pp. 163.

[9] Maloney, M. S.; Housman, D. G.; Gardner, R. M. (2014.): „Crime Scene Investigation - Procedural Guide", CRC Press, Taylor & Francis Group, Boca Raton, USA, pp. 5.

Citation: *Siniša Franjić, "Blood in Murder Investigation", Journal of Law and Judicial System, 2(3), 2019, pp. 18-22*