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## ROLE OF PHYSICAL CLUE AT CRIME SCENE

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### Abstract:

*Physical evidence usually involves objects found at the scene of a crime. Physical evidence may consist of all sorts of prints such as fingerprints, footprints, handprints, tidemarks, cut marks, tool marks, etc. Examination of some physical evidence is conducted by making impressions in plaster, taking images of marks, or lifting the fingerprints from objects encountered. These serve later as a comparison to identify, for example, a vehicle that was parked at the scene, a person who was present, a type of manufacturing method used to create a tool, or a method or technique used to break into a building or harm a victim. An examination of documents found at the scene or related to the crime is often an integral part of forensic analysis.*

*Physical evidence is any object that can establish that a crime has been committed or can provide a link between a crime and its victim or between a crime and its perpetrator. The examination of physical evidence by a forensic investigator is usually undertaken for identification and comparison. The purpose of identification is to determine the physical or chemical identity of a substance with as near absolute certainty as existing analytical techniques will permit. The objective of a comparison is to determine whether or not the suspect specimen and a control specimen have a common origin, by subjecting them to the same examinations and tests. In a comparison analysis, the forensic investigator must not forget the role that probability plays a determining factor in the discovering the origins of two or more specimens. Evidence is said to possess individual characteristics when it can be associated with a common source with an extremely high degree of probability. However, evidence that can be associated only with a group and never with a single source is said to possess class characteristics*

### KEY WORDS:

Crime Scene, Physical Evidences, Searching Method, Collection, Preservation, Forensic Science, Laboratory Examination, Comparison, Detection

### INTRODUCTION:

At the time of investigation of a concern crime which is occurred at any place, The Investigative police officer he should take some precautionary measures relating that crime scene, first and foremost Preservation of the scene and its evidence aims at implementing appropriate protective and anti-contamination measures to keep disturbances of the scene and the physical evidence to a minimum.

Scene preservation starts as soon as possible after the incident is discovered and reported to the appropriate authorities. Concerns for scene protection end only at the point where the scene investigation process is completed and the scene is released. Delineation of the area to be protected is a complex activity and the boundaries of the scene may change as the investigation unfolds. What appears to be obvious at the

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outset may change and need to be re evaluated. Once delineated, the area is clearly cordoned off using any kind of physical barrier. Any non-essential people who entered the scene before the cordon was established are removed (and this information is recorded) and any non-essential people are prevented from entering the scene during the entire scene investigation. From the beginning to the end of the crime scene investigation, strict anti-contamination measures are important. They include: wearing protective clothing, gloves and shoe covers; using a single path when entering the scene (this is also valid for medical personnel providing care to victims); keeping away from using any facilities available at the scene (e.g. toilet, water, towel, telephone), eating, drinking or smoking; avoiding moving anything/anybody, unless it is of absolute necessity (if something or somebody is moved, the initial location should be carefully documented). When selecting protective and anti-contamination measures, respect for the victim's privacy and human rights are important. If required, the use of screens, curtains, tents should be considered. If, during the course of the investigation, a second or third, related crime scene is discovered, each scene is treated separately (i.e. separate teams working on the different scenes). Finally, it should also be recognized that, strictly speaking, unaltered scenes are rarely if ever encountered. Discovery of the event may unavoidably alter the scene. In outdoor scenes, weather may compromise evidence. Further alterations may take place if it is necessary to provide medical aid to a victim or when action to ensure human security is required, such as extinguishing a fire or defusing an explosive device. In those situations, directions and guidance are given to the personnel to minimize disturbance of the scene and its evidence

Every incident, be it a crime, accident, natural disaster, armed conflict, or other, leaves traces at the scene. The goal of the subsequent investigation is to correctly interpret the facts, reconstruct the events and understand what happened. Due to the transient and fragile nature of those traces, their reliability and the preservation of their physical integrity depend to a very large extent on initial actions at the scene of the incident. Evidence integrity can be achieved with very limited means by observing a key set of guiding principles. Acting with care and professionalism throughout the crime scene investigation process is critical for the admissibility of evidence for court purposes as well as for human rights inquiries and humanitarian action

### **Forensic science services and the crime scene Investigation process**

The role of forensic science services starts at the crime scene with the recognition and recovery of physical evidence. It proceeds with its analysis and the evaluation of the results in a laboratory, and the presentation of the findings to judges, prosecutors, lawyers and others in need of the factual information. From the first responders to the end-users of the information, all personnel involved should have an adequate understanding of the forensic process, the scientific disciplines and the specialized services provided by forensic laboratories. Crime scene investigation is a process that aims at recording the scene as it is first encountered and recognizing and collecting all physical evidence potentially relevant to the solution of the case. The first responder(s), be they law enforcement officers, human rights officers or anyone else, play a critical role in the entire crime scene investigation process. Their initial responsibilities are to preserve the integrity of the scene and the evidence. Furthermore, they are responsible for the early documentation of the crime scene, its evidence and all activities at the scene. As in the majority of cases first responders are non-forensic personnel, adequate training to carry out these tasks is critical.

Under ideal circumstances, crime scene investigators who have received full-fledged forensic training quickly take over the work at the scene. However, there are situations that may require first responders (who are normally not expected to further process the scene) to carry out some basic recovery procedures before the arrival of the crime scene investigators, if there is a risk of the evidence being destroyed, lost or contaminated. In situations where there is no prospect for the crime scene to be processed by crime scene investigators, the responsibilities of the first responder might have to be extended beyond preservation and documentation activities. These situations typically occur if the crime scene is in a remote location, if skilled crime scene investigators are not easily available, or if the criminal justice system response is not adequate.

### **Evidence can be divided into two categories**

Testimonial - statements or the spoken word from the victim(s) or witness(es).

Physical - also referred to as real evidence, consists of tangible articles such as hairs, fibers, latent fingerprints and biological material.

The concept known as the "Locard's Exchange Principle" states that every time someone enters an environment, something is added to and removed from it. The principle is sometimes stated as "every

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contact leaves a trace”, and applies to contact between individuals as well as between individuals and a physical environment. Law enforcement investigators are therefore taught to always assume that physical evidence is left behind at every scene. This will be generally true, and the amount and nature of the evidence created will be largely dependent on the circumstances of the crime.

### **Examples include:**

Biological material - blood, semen or saliva  
Fibers  
Paint chips  
Glass  
Soil and vegetation  
Accelerants  
Fingerprints  
Hair  
Impression evidence – shoe prints, tire tracks or tool marks  
Fracture patterns – glass fragments or adhesive tape pieces  
Narcotics

Oftentimes, evidence tells a story and helps an investigator recreate the crime scene and establish the sequence of events. Physical evidence can corroborate statements from the victim(s), witness(es) and/or suspect(s). If analyzed and interpreted properly, physical evidence is more reliable than testimonial evidence; testimonial evidence is more subjective in nature. An individual's perception of events and memory of what happened can be incomplete or inaccurate. Physical evidence is objective and when documented, collected and preserved properly may be the only way to reliably place or link someone with a crime scene. Physical evidence is therefore often referred to as the "silent witness."

### **Every Contact Leaves a Trace**

The value of trace (or contact) forensic evidence was first recognized by Edmund Locard in 1910. He was the director of the very first crime laboratory in existence, located in Lyon, France. The Locard's Exchange Principle states that "with contact between two items, there will be an exchange."

### **Crime Scene Evidences**

#### **PAINT**

Physical and chemical analysis of paint can indicate its class or what type of paint it is (auto, house, nail polish, etc.) Individual characteristics, such as the color, number of layers, chemical composition, or features of paint chips, can be analyzed and used for matching evidence to a suspect.

#### **GLASS**

Particles found at various crime scenes (breaking and entering, hit and run, vandalism, or murder) will be analyzed to determine its properties, such as color, tint, thickness, density, chemical composition, and refractive index (RI).

#### **EXPLOSIVES**

Examination can determine the chemical composition to identify the type of explosive used and its origin. Traces of explosives found on a suspect may be matched to explosives from the scene. Materials used to make an explosive device will be compared to evidence found in the suspect's possession.

#### **BALLISTICS**

Characteristics of ammunition, firearms, and residue are examined to find matches between suspects and evidence found at a crime scene. Chemical tests can reveal gunshot residue (GSR) on suspect. Rifling in a gun barrel causes distinctive marks on fired bullets. The National Integrated Ballistics Identification System (NIBIS) is a data base used for ballistic evidence

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### **FRACTURE MATCHES**

When an object is broken, torn, or cut, two unique edges are formed (fracture lines.) These can be compared to see if they fit together to show that may have been part of the same object at one time. Investigators compare the pieces of tape, glass fragments, paint chips, pieces from a car, etc. to find possible matches

### **IMPRESSION EVIDENCE**

Shoepriints & Tire Tracks Impression evidence can be photographed, lifted with tape, or cast with plaster. Investigators will examine the evidence to identify the brand of shoe or tire based on the tread pattern and other physical features. Shoes and tires will also show wear patterns after being used for a period of time as well as other features (scratches, nicks, and cuts) that can be used to match evidence to specific items.

### **Bite Marks**

Each of the 32 teeth in humans is unique due to age and wear. Impressions and photographs of bite marks left on a victim, assailant, or other object at can be matched to dental records for the identification of a victim or suspect.

### **Tool Marks**

Tiny nicks and chips form on the edges of a tool as it is used, which can be used to identify matches between evidence and suspects. Tools may also pick up traces of blood or other substances that can be tested or have fingerprints that can be lifted.

### **BODY FLUIDS**

Blood, semen, saliva, sweat, and urine can be analyzed to provide information about the crime as well as its victim or the suspect. Chemicals and UV light can be used at a crime scene to find areas with body fluids, which areswabbed, bagged and collected in vials

### **DNA**

It can be extracted from almost any tissue-hair, fingernails, bones, teeth, & body fluids. DNA profile is created and compared to those from suspects or victims. CODIS (Combined DNA Index System) is a FBI data base that is used to find matches to unknown DNA samples from a crime scene.

### **HAIRS & FIBERS**

These may be transferred from a suspect to a victims and vice versa. Hairs can be examined to identify their origin, such as human or animal. Hairs with roots intact can be tested for DNA. Fibers are used to make clothing, carpeting, and furniture,. They may be natural fibers (plants or animals) or synthetic, (man made)

### **FINGERPRINTS**

There are 3 types of patterns: arches, loops, and whorls characteristics in a fingerprint are also Identify a suspect or victim. AFIS(Automatic Fingerprint Identification System) is a database used by investigators to find match to fingerprints found at a crime scene

### **WOUNDS**

Wounds can often be matched to weapons or tool marks on the weapon. Investigators may also be able to determine the weapon's size, shape, and length. Wounds analysis provides clues about a victim's injuries, the suspect (left-handed, right-handed, height, etc.), and positions of the victim and suspect.

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### QUESTIONED DOCUMENTS

Examiners will analyze a ransom note or other document to find clues to link it to a crime scene or a suspect. The type of paper used, printing, handwriting style, or type of ink will be analyzed. Unique features, such as watermarks or indentations on a paper, may provide useful clues.

### DUST & DIRT

Dust, dirt, or sand evidence can reveal where a person has traveled and may be picked up at a crime scene or left behind. Investigators examine the samples for chemical composition, pollen, plants, and other organic matter to find links to a specific crime scene.

### SKELETAL REMAINS

These are analyzed to determine a victim's age, sex, race, and stature (height/build). Sex can be determined by examining the pelvis, humerus, and femur. Age and stature can be determined by analyzing teeth, bone growth, and the length of specific bones (femur.) Race can be determined by analyzing the skull for specific characteristics. Remains may also provide clues as to the death or the victim's life history.

### Physical Evidence

Can prove a crime has been committed or establish key elements of a crime  
Can place the suspect in contact with the victim.  
Can exonerate the innocent  
Can corroborate the victim's testimony  
May make suspects admit or even confess  
May be more reliable than eye witness

### Physical Evidence

Physical evidence is one of the most common types of evidence found at a crime scene. Physical evidence consists of the actual physical objects found at the scene. This can mean large items such as damaged cars, broken glass or smashed doors. It also includes items that are minuscule in size, such as hair or clothing fibers. An investigator may also collect weapons such as knives or guns, or fired bullets and spent casings. Depending on the scene, physical impressions may also be found, including tire tracks or footprints. A suspected burglary may lead the investigator to look for tool marks on the doors or windows. Finally, physical evidence also includes fingerprints and lipstick impressions left on glasses or cigarettes. If it can be touched, picked up or moved it constitutes physical evidence.

### Trace evidence

Trace evidence is a subset of physical evidence consisting of evidence so small it may not be readily apparent but is still found in a sufficient quantity to be measured. Often a microscope or ultraviolet light may be needed to see the trace evidence. Trace evidence can consist of trace amounts of blood found on a wall or on a knife blade. It may also include wood splinters from a bullet hole, or minute amounts of dirt on a pair of shoe

### Drug Evidence

While drug evidence is technically physical evidence, it is usually classified by itself. Drug evidence consists of any legal or illegal substance controlled by law. The evidence may consist of large quantities of the drug, or trace amounts such as powder on a spoon or resin in a pipe. It also includes evidence of the use, ingestion, manufacture or distribution of controlled substances. Consequently, syringes, scales, pipes and plastic bags are considered drug evidence if they appear to have been used to ingest, manufacture or distribute drugs.

### Other Evidence

There are a variety of other types of evidence found or collected at a crime scene that may not fit

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into the other categories. Toxicology reports are used to determine what substances were in a person at the time of the crime. Crime scene reconstructions are performed at the scene to try and determine bullet trajectories or blood spatter. Interviews with witnesses, suspects and victims also constitute evidence, and most initial interviews occur at the crime scene.

### CRIME SCENE

Is a scene, either a person, place or an object capable of yielding PHYSICAL EVIDENCE which has the potential of assisting in apprehending or exonerating the suspect.

A crime scene is a location where a crime took place (or another location where evidence of the crime may be found), and comprises the area from which most of the physical evidence is retrieved by law enforcement personnel, crime scene investigators (CSIs) or in rare circumstances, forensic scientists. Crime scenes may or may not be where the crime was committed. There are different levels and types of crime scenes.

Different types of crime scenes include outdoors, indoor, and conveyance. Outdoor crime scenes are the most difficult to investigate. The exposure to elements such as rain, wind, or heat, as well as animal activity, contaminates the crime scene and leads to the destruction of evidence. Indoor crime scenes have a significantly lower chance of contamination because of the lack of exposure. The contamination here usually comes from the people factor. Conveyance crime scenes are crimes committed by means of transportation, such as robbery or auto theft. Each type of crime scene, along with the nature of the crime committed (robbery, homicide, rape, etc.) have different procedures.

#### There are three types of crime scenes

##### Outdoor

An outdoor crime scene is the most vulnerable to loss, contamination and deleterious change of physical evidence in a relatively short period of time. Individuals with access to the scene can potentially alter, destroy or contaminate evidence. The risk is greatest when investigators fail to secure the crime scene properly.

Destruction or deterioration of evidence due to environmental conditions such as heat, cold, rain, snow and wind are problems associated with outdoor scenes. Evidence that cannot be protected under these conditions should be collected expeditiously without compromising its integrity. Investigators who encounter a combination of an indoor and outdoor scene should give priority to processing the outdoor component.

Nighttime outdoor crime scenes are especially problematic. Regardless of the quality of the light source used to illuminate the scenes, the lack of sunlight can lead to investigators inadvertently missing or destroying evidence. Whenever possible, outdoor crime scenes should be held and secured until daylight for processing.

##### Indoor

Compared to an outdoor scene, evidence at an indoor scene is generally less susceptible to loss, contamination and deleterious change. Indoor crime scenes are usually easier to secure and protect, and securing a scene can be as simple as closing a door.

The methods used by forensic laboratories have evolved so that very small amounts of biological material can produce a usable DNA profile. This, however, means that the potential for detecting DNA traces deposited by contamination at crime scenes becomes a factor. Contamination of any crime scene can easily occur if proper precautions such as limiting the number of people inside the scene, are not taken. For example, first responders, emergency medical personnel, patrol supervisors, crime scene investigators, and medical examiners are all potential sources of contamination and/or loss of evidence

##### Conveyance

Conveyance is defined as "something that serves as a means of transportation." Types of crimes committed in conveyances include, but are not limited to:

Vehicle Burglary  
Grand Theft

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Car Jacking  
Narcotics Violation  
Sexual Battery  
Homicide

It is important that the crime scene investigator recognize that physical evidence recovered from these scenes may extend well beyond the conveyance itself. The flight path of the perpetrator may reveal evidence important to the investigation. For example, impression evidence, such as shoe or footprints in soil, may be found leading away from the scene, and property removed from the conveyance may be deposited or dropped as the perpetrator flees the scene. Cigarette butts are sometimes found in and around the conveyance. The nature of the crime may give the investigator an idea of the type of evidence present. To protect the scene against inclement weather and other factors that may contribute to evidence loss and/or destruction, a conveyance such as a vehicle may be transported to the laboratory after proper documentation has been completed.

### Protecting and purpose

When a crime occurs and the law enforcement officers arrive on the scene, what steps are needed to protect the evidence? Why are the procedures in place for the collection of different types of evidence? What evidence is allowable in court, and what is not?

This activity will allow you to discover the processes implemented by law enforcement, as well as by forensic technicians to secure a crime scene. You will discover why all professionals involved must function as a team for the sake of the victims and society. The most important person at a crime scene is the first officer to arrive. The first responding officer often makes or breaks a crime scene. The manner in which he initially handles a crime scene can dictate how things go in the overall investigation. The journey from crime to conviction begins when the first officer arrives. Let's take a look at some issues an officer can face if he's first at the scene.

When encountering a crime scene, the first responding officer needs to quickly do several things. Initially, the safety and well being of any individuals present is paramount. Removal of potential threats to self and others takes precedence over first aid to those already on the crime scene. This involves self protection for the officer, ensuring that he is safe and that the threat of additional victims is minimized. Next, the officer needs to care for the injured. If the victim is still alive, an attempt should be made to take a dying declaration. While it is possible that emergency medical personnel have been called to the scene, it may be necessary to administer first aid to any victims.

Once people at the scene have been attended to, the important work of crime scene investigation begins. Step one involves dealing with the evidence. First, make sure that all potential evidence is preserved. The first officer should try to find the entry and exit of the suspects and victims, and direct the emergency personnel to enter at another point or via a pathway that the officer has already established as a safe pathway. This is where the least evidence is disturbed. Remember, at this point, anything may be evidence and scrutinized in court. Before a crime scene is secured, it is easy to destroy evidence; the presence of relatives of victims or the officer himself can easily affect the state of the evidence. Be aware that suspects' friends or families of the victims may try to remove or alter important evidence from the crime scene. For example, family may attempt to make a suicide look like an accident in order to collect insurance money.

The scene may be chaotic with injuries, loss of life, and a host of witnesses and other people present but it is important that the first responding officer records as much information as possible. It may be too difficult to painstakingly write everything down, but a record (even just notes jotted in a notebook) will help to serve as a definitive chronicle of what happened. It may be used by investigators to decide how to proceed; by prosecutors to decide how to try the case; and by defense attorneys to question the police action. Everything from treatment of the injured to the apparent nature of the crime should be noted. Document what was seen, what was done, and who was there. In addition to the written notes, the officer should be making mental notes as he makes a visual inspection of the scene. If possible, the first officer can take unobtrusive photos of any crowds or people.

Again, the first officer to respond dictates the overall direction of the ensuing investigation. Remember: if the actions of the first responding officer are undocumented and poorly organized, then all the following events in the crime scene search may lack direction.

The first responding officer should secure and protect the scene focusing on the immediate area. By not attempting to go beyond human capacity, the officer should do whatever he can to gain control. As more officers arrive, the scene can be expanded and duties can be parceled out.

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Dealing with victims is first priority, but dealing with witnesses is a close second. As quickly as possible, identify witnesses and keep them at the scene. Witnesses often have second thoughts, so opt for a thorough questioning at the scene. Keep witnesses separate to avoid collaboration of testimony. Memories fade and other issues may influence the decision of witnesses to cooperate later.

The first responding officer is tasked with getting the ball rolling, so to speak. He contacts the department with details of what he has and what he needs. Maybe he doesn't need more help; maybe he does. His estimation of manpower and expertise to properly process the scene is key to investigating the crime and prosecuting the perpetrator. Once additional crime scene officers arrive, the first responding officer should explain everything he saw and everything he did.

Of utmost importance is any actions taken by the first responding officer regarding weapons. A weapon may have been moved in order to make the scene more safe and secure or to allow the EMS to perform care for the victim. If that's the case, the officer needs to document what he moved and where.

The first responding officer holds a tremendous amount of responsibility not only for the crime scene but also for the overall investigation and ultimately the prosecution of the case. It is easy to tell a first responding officer what to do if he is part of a large department with dedicated crime scene officers and detectives to turn the crime scene over to. In smaller agencies

### Evidence Collection

Locating and identifying physical evidence at crime scenes, as well as identifying potentially missing evidence, is very challenging and is much more difficult and demanding than it might appear to those unfamiliar with crime scene investigation. The most relevant and important evidence may not be obvious or directly visible to the naked eye. The construction of an exhaustive listing of the steps to recognize evidence at crime scenes is not possible.

Typically the recognition of physical evidence starts by observing the scene. Based on initial observations and taking into consideration the context of the case, possible scenarios, the nature of the incident, as well as characteristics of surfaces that may bear potential evidence, a search strategy, which is both flexible and methodical, is implemented. This includes searching with the naked eye and magnifiers but also using various hand-held light sources. Basic testing procedures might have to be carried out to detect physical evidence, e.g. use of powders to enhance finger marks at crime scene or the use of chemicals to visualize traces of blood.

Once the evidence is recognized, appropriate recovery methods (e.g. adhesive tape, tweezers, cotton tips) and adequate packaging (e.g. collection bags/boxes, containers for sharp objects) are used. Each piece of evidence is labeled and sealed following requirements as per local regulations. Priorities in evidence recovery might have to be decided to avoid unnecessary loss or degradation of evidence. Documentation is an integral part of the recovery process, including the precise location of the evidence before recovery.

Selecting what is relevant is the challenge of the recognition and recovery phase and is most efficient and effective when it takes place at the scene, where the potential evidence exists in the context in which it was produced. However, under difficult conditions it might be preferable to recover more evidence and select at a later stage of the investigation. Evidence recognition and recovery requires experience and extensive training. It also requires a good understanding of what can be done on the various types of physical evidence in a forensic laboratory as well as the information that can be obtained.

As part of the recovery process, in many instances, substrate samples and background samples are necessary, e.g. when collecting fire debris. In situations where the evidence may be very large, representative sub-samples are usually collected, e.g. from bulky drug seizures. Sampling activities require experience and training. Finally, it is recognized that in almost all cases physical evidence is missed and not recovered. Due diligence in recognition and recovery of physical evidence contributes to diminishing this factor.

Evidence is collected through two ways: forensics and interviews. All forensic evidence is bagged separately to prevent any cross-contamination. Forensics uses a variety of different tools and techniques. Fingerprint collection through the use of grey or black magnetic powder. DNA and other bodily fluids are collected and, whether it is hair or fluid, for further examination in a lab. Shoe and tire prints can be collected using dental stone. Electronics are taken for examination by a technical expert to search for further evidence. Documents from the area are also taken for further examination. Ammunition and weapons are taken for matching to wounds and ballistics. Photographs of tool marks are taken because they can be matched to a weapon at a later time. Any other trace evidence is also collected. Trace evidence is anything left behind by a perpetrator or could have been transferred to the perpetrator. Interviews of both witnesses and victims of the crime are taken by law enforcement officials in order to gain knowledge and creating a

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timeline of events.

### **Documentation**

Photographs of all evidence are taken before anything is touched, moved, or otherwise further investigated. Evidence markers are placed next to each piece of evidence allowing for organization of the evidence. Sketching the scene is also a form of documentation at a crime scene. This allows for notes to be taken as well as to gauge distances and other information that may not be easily detected from only a photograph. The investigators will draw out locations of evidence and all other objects in the room. The sketch is usually drawn from an above point of view. Notes are taken by investigators to ensure memorization of their thoughts and suspicions about different pieces of evidence.

### **Crime Scene Preservation**

A perimeter is taped off with yellow police tape in order to keep only those necessary on site. This is done to preserve evidence of the crime. Any experienced crime scene officer will tell you that the key to doing the job well is protecting the crime scene. What does that mean? In a nutshell, it means securing the scene, limiting access to only essential personnel, and keeping complete and accurate records of everything that happens there. These steps require work and diligence on your part, but your effort will pay off when you end up with high quality results that will stand up in court.

The first person on the scene should secure it. However, the first officer on the scene is often confronted with many challenges, especially when dealing with a major crime. Before securing the scene, the officer must establish priorities. For instance, if the officer finds victims needing medical aid, the officer must first provide assistance and call for help. At the same time, the officer must be alert to the presence of suspects and deal with them accordingly.

Once establish the outer perimeter of your scene, you need a way to secure that boundary. Everyone uses crime scene tape for this job, but tape doesn't necessarily stop people from entering. You should also have officers stationed around the perimeter of the scene to make sure unauthorized people don't enter. And of course, the larger the scene, the more officers you're going to need, so plan accordingly.

### **Location & Collection of Evidence**

Items of physical evidence are not always visible to the naked eye and may be easily overlooked. A deliberate, methodical, disciplined approach to collection and preservation of evidence is essential. One exception may be if evidence integrity is at risk, and under those circumstances it is important that rapid decisions be made to prevent its degradation and/or loss.

It is imperative that the investigator obtain as much information as possible regarding the circumstances of the crime prior entering the scene. Statements from witnesses, victims, or first responders can provide a broader understanding of the investigation. The investigator can develop an approach to the scene based on this information and the nature of the crime. For example, at the scene of a burglary, attention may focus on the point of entry. Fragments of wood, metal, or broken glass may be discovered, along with fingerprints, blood, and fibers from clothing deposited when the perpetrator forced entry.

In the case of a violent crime such as a sexual assault, attention may be directed to the clothing and the person of the victim(s) and the suspect(s). An investigator might find body fluids, stains, torn clothing, fingerprints, fibers, hair, and other trace materials in the areas where attack took place. Potential evidence such as saliva, bite marks, semen, hair, skin tissue under the finger nails, and other trace materials may be found on the victim(s). Transferred evidence such as cosmetics, vaginal fluid, hair from the victim, and blood may also be found on the suspect.

Once potential evidence is located and documented, the next step is to collect and package the items in a manner that prevents contamination loss, and deleterious change.

Biological evidence requires care to guard against the possibility of cross contamination either by the investigator or by other biological specimens at the scene. Equipment is available to crime scene investigators which aide in the prevention of cross contamination.

### **Preservation of Evidence**

From crime scene to forensic laboratory to courtroom, all evidence must be inventoried and secured to preserve its integrity. Evidence admissibility in court is predicated upon an unbroken chain of custody. It is important to demonstrate that the evidence introduced at trial is the same evidence collected at

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the crime scene, and that access was controlled and documented.

An understanding of the rules governing chain-of-custody is vital for an investigator. For example, in a sexual assault incident, the victim is typically transported to another location to have a sexual assault examination performed. Many jurisdictions have established teams to perform these examinations, and they go by several names, such as: Sexual Assault Victim Examination (S.A.V.E.), Sexual Assault Nurse Examiners (S.A.N.E), Sexual Assault Response Team (S.A.R.T) . The examination involves the collection of the victim's clothing, hair samples, swabs for body fluids, and documentation of bruising and bite marks. The materials collected are packaged by the team members.

### **Proper evidence packaging includes:**

Appropriate packaging and labeling of all items  
Each item properly sealed and marked  
Correct and consistent information recorded on label and procedural documentation

The evidence is turned over to the investigator for submission to a department's property and evidence section. A receipt documenting the transfer is obtained. Generally, submissions to the forensic laboratory are done on a request for analysis form, listing the evidence items, and a documented chain of custody. Each individual assuming custody of the evidence from collection through analysis signs the chain of custody document. Many departments have automated this process using an information management system, whereby all transfers are securely done using barcodes. The chain of custody report will identify each individual contributing to the analysis of the evidentiary materials.

Once the analysis is complete, the evidence is either returned to the submitting agency or stored by the laboratory. The chain of custody will document this disposition. All law enforcement reports, photographs, lab analysis reports, and chain of custody documents are kept in the case file, which can be made available to the prosecution and is subject to discovery by defense counsel.

Think of the chain of custody as a chain, if one link should be broken, the chain is broken, and the evidence collected may be ruled as inadmissible.

### **Collection Techniques**

The importance of avoiding cross contamination cannot be overemphasized. The investigator performing the collection must ensure tools are clean and/or sterilized and that gloves are changed between handling each sample.

Collection methods differ depending on the type of evidence and the substrate upon which it is found. It is preferable to collect evidence in its original state. If the evidence is fragile or can easily be lost, the entire object should be collected and packaged, if size and circumstances permit.

Some laboratories recommend the submission of substrate controls. Substrate controls are clean samples of the collection materials or unstained portions of the material the biological evidence is deposited on. The laboratories can use these to troubleshoot contamination, Polymerase Chain Reaction (PCR) inhibition, or interference with fluorescence.

The investigator should consult the local forensic laboratory and refer to the department standard operating procedures regarding collection and preservation of biological evidence.

#### **Procedures for Evidence Collection**

##### **Blood & Other Body Fluids**

Type of Collection	Procedure
Cuttings	Removal of a section of the item containing the stain using a sterile or clean cutting device.

**Wet Absorption** A sterile swab, gauze pad, or threads are slightly moistened with sterile distilled water. An effort should be made to concentrate the stain in a localized portion of the swab or pad. For example, when using a swab, the stain should be concentrated on the tip. The collection medium is concentrated into the stain and allowed to air dry. Some laboratories recommend following the first moistened swabbing with a second dry swabbing to ensure thorough sample collection. Both swabs are retained and submitted for analysis.

##### **Scraping Method**

Using a clean razor blade or scalpel, the sample is scraped into a clean piece of paper that can be

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folded and packaged in a paper envelope or other appropriate packaging.

### Lifting with Tape

For dried blood stains on a non-absorbent surface, fingerprint lifting tape may be placed over the stain and lifted off. The stain is transferred to the adhesive side of the tape, which may then be secured on a clear piece of acetate for submission to the laboratory.

Hair & Fiber Collection	
Type of Collection	Procedure
Visual Collection	

On some surfaces, hairs and fibers can be seen with the naked eye. Using clean forceps and trace paper, the sample can be removed from the surface and placed into a clean piece of paper that can be folded and packaged in a paper envelope or other appropriate packaging.

### Tape Lifting

Water or methanol soluble tapes are available for the collection of trace hair and fiber evidence. The tape is applied to the location of the suspected sample, removed, and packaged.

### Vacuuming Method

The area where the suspected samples are located are vacuumed up and caught in a filtered trap attached to the vacuum. These samples are packaged in clean trace paper for submission to the laboratory. Vacuuming is the least desirable collection method because there is a risk of cross contamination if the equipment is not properly cleaned between each use.

The value of physical evidence and the concept of chain-of-custody

Physical evidence can be anything from massive objects to microscopic items, generated as part of a crime and recovered at the scene or at related locations. Considering all sources of information available in investigations (e.g. confessions, testimonies, video surveillance), physical evidence plays a pivotal and an especially valuable role. With the exception of physical evidence, all other sources of information suffer from problems of limited reliability. Physical evidence, when it is recognized and properly handled, offers the best prospect for providing objective and reliable information about the incident under investigation. However, the value of even the most carefully recovered and preserved evidence can be lost if the chain-of-custody is not properly maintained. "Chain-of-custody" is often recognized as the weak link in criminal investigations. It refers to the chronological and careful documentation of evidence to establish its connection to an alleged crime. From the beginning to the end of the forensic process, it is crucial to be able to demonstrate every single step undertaken to ensure "traceability" and "continuity" of the evidence from the crime scene to the courtroom.

## SUGGESTIONS AND CONCLUSION

The role of forensic science services starts at the crime scene with the recognition and recovery of physical evidence. It proceeds with its analysis and the evaluation of the results in a laboratory, and the presentation of the findings to judges, prosecutors, lawyers and others in need of the factual information. From the first responders to the end-users of the information, all personnel involved should have an adequate understanding of the forensic process, the scientific disciplines and the specialized services provided by forensic laboratories. Crime scene investigation is a process that aims at recording the scene as it is first encountered and recognizing and collecting all physical evidence potentially relevant

To the solution of the case. The first responder(s), be they law enforcement officers, human rights officers or anyone else, play a critical role in the entire crime scene investigation process. Their initial responsibilities are to preserve the integrity of the scene and the evidence. Furthermore, they are responsible for the early documentation of the crime scene, its evidence and all activities at the scene. As in the majority of cases first responders are non-forensic personnel, adequate training to carry out these tasks is critical

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