

DEATH INVESTIGATION

A Handbook for Police Officers

By

TERRY L. CASTLEMAN

DEATH INVESTIGATION



ABOUT THE AUTHOR

Lieutenant Terry L. Castleman retired from the Sangamon County Sheriff's Department, Springfield, Illinois with 25 years of experience, and 20 of those years were as a death investigator. He has a degree in Law Enforcement Administration and has completed numerous courses offered by the prestigious Department of Pathology, St. Louis University School of Medicine in St. Louis, Missouri. An instructor and lecturer, he has presented classes and lectures to thousands of police officers, prosecutors, coroners, and pathologists across the country. He has consulted on several homicide cases throughout the United States.

He is a past member of the Illinois Police Association, the Michigan Society of Forensic and Investigative Hypnosis, the International Society of Forensic and Investigative Hypnosis, the Midwest Homicide Investigators Association, the American Society of Law Enforcement Trainers, the Illinois Coroners and Medical Examiners Association and past President and member of the Fraternal Order of Police. Lt. Castleman currently holds an active membership with the International Association of Bloodstain Pattern Analysts.

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The thousands of investigative hours conducted by the men and women deputy sheriffs of the Sangamon County Sheriff's Department in central Illinois during the homicide of our friend and fellow police officer, Deputy Sheriff William D. Simmons, must be noted. Their professionalism and perseverance through nearly two painful decades before the killer was convicted must also be recognized. I know that the murder of Deputy Bill Simmons touched the hearts and lives of all who called the Sangamon County Sheriff's Department home. With this in mind, this book is dedicated to the men and women, past and present, who proudly wear the uniform of the Sangamon County Sheriff's Department.

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PREFACE

THIS HANDBOOK IS INTENDED to be an investigative resource for all police officers who are charged with the responsibility of investigating death. It is written to be both an in-depth and quick reference guide. It will help the development of the necessary skills that any police officer utilizes during the course of each death investigation.

Drawing upon two decades of experience as a police death investigator and 15 years of teaching death investigation-related courses to thousands of police officers, prosecutors, emergency medical personnel, coroners and pathologists, the various aspects of cause and manner of death are examined in this book

This manual has been written to provide relevant educational material for persons who will be involved in the scientific or legal circumstances relating to the investigation of death. The book defines the role of the police death investigator, discusses numerous manners of death, defines procedures for investigating the crime scene, techniques for identification of the unidentified victim, methods for proper handling and transport of the body, and establishes methodical approaches to any death investigation. Pertinent information relating to the basic understanding and use of innovative investigative techniques such as the use of hypnosis, bloodspatter interpretation and psychics are examined.

The police officers that will be involved with death investigation need to develop and enhance his or her own style of approach to this type of investigation.

This handbook is suitable for the college law enforcement or criminal justice student, and may be also utilized as a supplemental study guide for death investigation-related college courses.

T.L.C.

INTRODUCTION

I SPENT TWENTY-FIVE YEARS as a Sangamon County (Springfield, Illinois) Deputy Sheriff. It was the most rewarding career that anyone could ever hope to achieve. In the 20 years that I spent working death investigations, I had the distinct honor of having solved more than 50 consecutive murders. Although all murders were important to me, there was none more meaningful than solving the seventeen-year-old murder of my friend and fellow officer, Deputy William D. Simmons.

I cannot tell you how many deaths that I actually investigated during this time, as there were simply too many. I can say that I attended more than 300 autopsies. Once I even assisted in the performance of a postmortem examination. It had to be one of the strangest things that a police officer can ever do. If I could ever live my life over, I would be a forensic pathologist.

For years other police officers asked me to teach them how I did what I did when it came to death investigation. I hesitated in doing so because I did not know why I was successful investigating deaths. I dismissed it saying, "What works for me may not work for you." This attitude changed shortly after attending a Bloodspatter Workshop in Minnesota, instructed by Bart Epstein and Terry Labor. I learned a great deal from the information they taught. However, it was not until I returned home and attempted to share what I had learned with some pathologists from Memorial Medical Center that I truly understood what I had learned.

From that point on, I began teaching classes. I taught at Lincoln Land Community College, The Springfield Police Academy, The Illinois State Police Academy and with the local mobile training unit. I taught classes in: death investigation, bloodspatter interpretation, crime scene investigation, crime scene processing, interview and interrogation techniques, and forensic hypnosis. These were classes that I

had attended and I did not realize my own knowledge and expertise in these areas until I began to share what I had learned. It seemed that the more I taught and shared with others, the more I learned. I have now shared my knowledge with more than 3,000 medical examiners, coroners, lawyers and police officers from five different states.

I would like to point out one important factor that cannot be learned simply by reading this book, or any book, and cannot be taught in a classroom. For any investigation to be successful you must have TEAMWORK. Sangamon County law enforcement went through a very painful growth in homicide investigation that lasted nearly a decade. It is paramount that every person in a death investigation know the significance of teamwork. This includes all law enforcement, prosecutors, coroners, medical examiners, and crime laboratory personnel.

I don't know why teamwork was such a problem. No one seemed to work together, and everyone thought that everything was someone else's job. Well-known news commentator Paul Harvey was once given credit for saying, "If you want to get away with murder, do it in Sangamon County." That was pretty much true for the time period from 1960 through 1970. About this time, J. William Roberts, became the states attorney. He stated, "We will all work together. We will suffer the burdens together, and we will rejoice in our triumphs." This philosophy was long overdue, and it worked.

This handbook contains information that can be used for in-depth reading about specific information, or for quick reference. This information is intended to assist you with various types of death investigation. I hope that you will find this book not only interesting, but helpful in conducting any investigation you are involved with. It is with knowledge and experience that we can perform all the necessary tasks which must be done in all death investigations.

It is with utmost importance that I embrace the memory of the late Dr. Grant C. Johnson, forensic pathologist. I have truly only admired two men in my life. One was my late father, for having taught me about life. The other was Dr. Johnson, for having taught me so much about death. All that I was, as a death investigator, I learned from the teachings of these two men. Dr. Johnson treated me like a son and he spent countless hours teaching me about life after death and the forensic evidence that a corpse can provide. The days of examining the

hundreds of victims of death, and the endless nights of rolling on Dr. Johnson's living room floor role-playing a victim's last moments alive, shall forever be remembered.

ACKNOWLEDGMENTS

It saddens me that I cannot acknowledge by name everyone that had a positive influence on me during my career in law enforcement.

There are several people that must be noted, for without them, this book would not have been written. I must mention the late Grant C. Johnson M.D., and all the medical staff of the Department of Pathology, Memorial Medical Center, Springfield, Illinois. Thank you for having patience with me, and sharing your expertise in the investigation of death.

To J. William Roberts, former Sangamon County States Attorney, Springfield, Illinois and Justice Benjamin K. Miller, Illinois Supreme Court; I thank you for providing your legal knowledge and experiences.

I must also make mention of six of my friends and co-workers that had a positive impact on my investigative career. From the Sangamon County Sheriff's Department, Springfield, Illinois, Chief Loren Larsen (Retired), Captain John Pyle (Retired), Lieutenant Jack Lewis (Retired), and Sergeant Rick Miller: your confidence, continual support, and the invaluable assistance that made our department so successful with so many homicide investigations.

To Professor Ivan Wright, Lincoln Land Community College, Springfield, Illinois. It was through your efforts that I began teaching. Thanks for all your help at the college.

To Commander Marcia A. Lange (Retired), Springfield Police Department, Springfield, Illinois, I started my investigative career with you and will end it with you. Thanks for all your support.

A heartfelt acknowledgment and thank you to my wife, Laurel J. Castleman. Your support in my teachings and writings has meant so much to me. You are such an important part in my life and in all that I have become.

To my mother, Fairy Castleman, thank you for all your help. Mom was such a good listener and she heard about all my cases. She also told me at the beginning of my police career to write things down and put it in a book someday. Well, mom, here it is.

To Mrs. Pat Pemberton, Bachelors in Journalism, who helped perfect this manuscript, thank you for your countless hours on this endeavor.

To Mr. Michael Payne Thomas, publisher, without his sharing of knowledge and expertise, this handbook could not have been completed.

CONTENTS

	<i>Page</i>
<i>Preface</i>	ix
<i>Introduction</i>	xi
 <i>Chapter</i>	
1. DEATH DEFINED	3
2. THE ROLE OF THE DEATH INVESTIGATOR	6
3. IDENTIFYING THE VICTIM	15
4. CAUSE AND MANNER OF DEATH	19
5. ESTABLISHING TIME OF DEATH	23
6. CAUSES OF DEATH	34
7. ASPHYXIA BY POISONING	40
8. DEATHS DUE TO FIRE	46
9. DROWNING	54
10. GUNSHOT WOUNDS	59
11. CUTTING, STABBING AND BLUNT TRAUMA	66
12. ELECTRICAL AND LIGHTNING DEATHS	72
13. TRAFFIC CRASHES	76
14. DEATHS DUE TO COCAINE	84
15. INFANT DEATH	90
16. SUICIDE	99
17. HOMICIDE	104
18. THE SCENE	117
19. USE OF BLOOD AS EVIDENCE	131
20. USE OF HYPNOSIS	139
21. USE OF PSYCHICS	145
22. STUDIES AND EXPERIMENTS	150
 <i>Glossary</i>	 153
<i>Index</i>	157

DEATH INVESTIGATION

Try to understand that all my life I have believed that all things happen for a reason. We may not know why at first, but eventually we will understand all that happens. I have also concluded that we will learn from these things in our lives that do happen. Life is given to us to live as we choose, but it is taken away from us by death. This happens all too often without offering any choices at all.

Terry L. Castleman

Chapter 1

DEATH DEFINED

THE OLD ADAGE that only two things are certain, death and taxes, is fairly accurate. Some folks may not pay taxes, but the single most absolute fact in life is that everyone will die. Biologically speaking, the course of death is an eventuality. Different tissues and organs in a living body die at different rates. We can break down death into two categories.

Molecular Death: Different tissues die at different intervals. The brain may die but the muscles respond to electrical stimulation for several hours.

Clinical Death: Death as a whole, failure of the body, respiration and circulation cease.

SUDDEN UNEXPECTED DEATH

Definitions

Sudden: Quick or not expected.

Unexpected: Usually refers to death occurring in a healthy person.

Sudden unexpected deaths are related to natural causes (see Chapter 15 for Sudden Infant Death). Some 60 percent to 70 percent of all deaths that come under the jurisdiction of the coroner or medical examiner are due to natural causes. The establishment of cause of death in sudden or unexpected deaths calls for good investigation. Beware of one manner of death masquerading as another. Listed below are two examples of events that can produce a natural death.

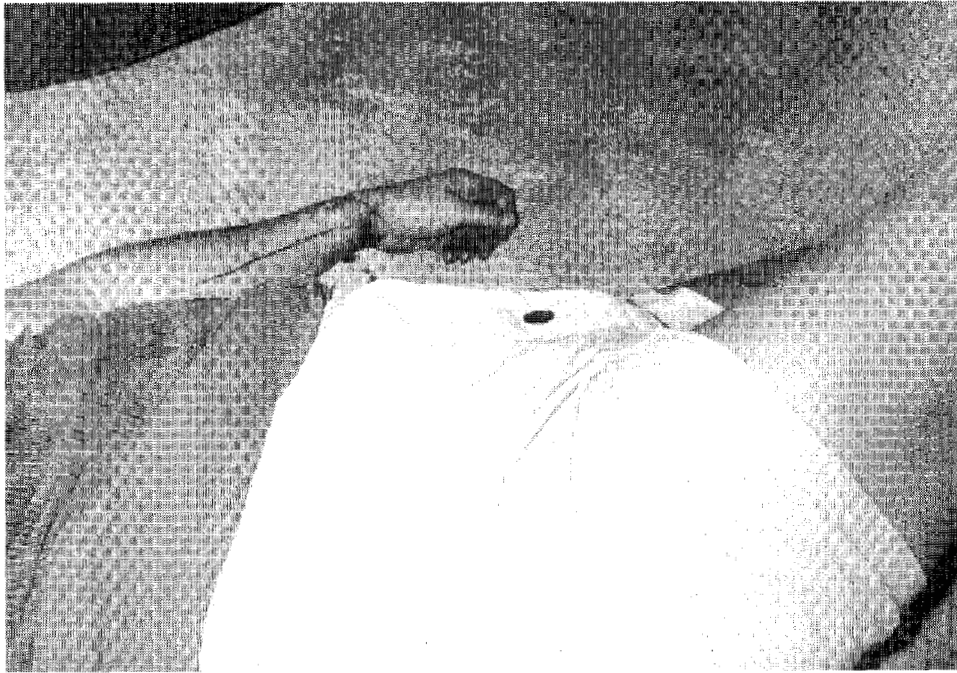


Figure 1.1. One form of death can masquerade as another form. Initial observation would indicate that the victim may have died as a result of suicide. Very little blood was found. The victim actually died from pneumonia.

Natural Causes of Death

Heart Attack: (Number one killer)

Symptoms:

1. Shortness of breath
2. Pains in chest

Stroke:

1. Clot in brain area
2. Cerebral hemorrhage
3. Embolism—air in circulatory system

Symptoms:

1. Paralysis on side of body
2. Dizzy
3. Difficulty of speech
4. Affects memory

The autopsy reveals the most probable cause of death; it may not necessarily be incompatible with life but there is no other reason or

explanation. A competent investigation may avert the need for an autopsy. However, if there is any doubt, then have an autopsy performed. It would not be unusual for the family to request an autopsy. Family members will want to know the reason that their loved one died.

Legal concerns of actual death must be considered. In some instances persons are kept alive by artificial means. Should the life support be removed the victim may or may not die. However, in the matter of harvesting organs, the victim must be kept on life support to insure that the transplants of such organs as the lungs, liver or heart are feasible.

Depending on your personal, ethnic or religious opinions, you may hold many different beliefs about death. Some people consider as true that when you die, that is the end. The body simply turns to dust. Others believe that after you die you are reincarnated, into someone or something else. Other beliefs are that when you die you go to be judged for the deeds of your life on earth. At this point you are cast into Purgatory, condemned to Hell or rewarded with Heaven. Still there are some that are of the opinion there is a place or a horizon that is in between life and death. Life after death, without our own beliefs, how do we know what is and what is not true. You will need to have your own thoughts and feelings about what happens after you die. You will also need to honor and respect the beliefs of others.

Chapter 2

THE ROLE OF THE DEATH INVESTIGATOR

PERHAPS BECAUSE I COME from the old school, I have always believed that hands-on experience is always the best way to learn about death investigations. There are two very significant problems with this thought. First, it is not possible to learn if not given the opportunity to do so. Second, in a major case it is not always possible to share knowledge and expertise with so much riding on an investigation. From the arrival of the first officer on the scene, everything that is done and in some cases not done, becomes extremely crucial.

The coroner, or the coroner's physician, or the medical examiner is responsible for the body. Law enforcement is responsible for the scene. The body is a part of the scene, therefore the death investigator must be satisfied that everything that can be done, has been done prior to any moving or removal of the body. In jurisdictions across the country the medical examiner or the coroner has the legal responsibility of investigating all violent, suspicious or sudden deaths. It is therefore necessary that the death investigator knows who is responsible for all types of death, within his or her jurisdiction. It is imperative that the investigator knows what can and cannot be done. Neither the coroner nor the pathologist is going to conduct the investigation into how this death occurred, or in some instances, who caused the death, that is the responsibility of the police. Remember, any successful endeavor involving more than one person requires total cooperation.

There are several categories of death that should be investigated by the death investigator. All violent deaths, non-violent deaths of persons under the age of 40, all suspicious deaths, deaths at the workplace and deaths that occur while in custody. There are five types of death that the police need to be concerned with: homicide, suicide, accident, natural and unknown. One might ask why a natural death should be

of concern to the police. The reason for this is because any type of death can be disguised as another type.

Because of the vast amount of authority that the police death investigator has, your integrity must never be compromised. It is not unusual to be approached by others in your department, police officers from other agencies or prominent political or social figures who will attempt to influence you or your findings in a particular case. Police officers must be prepared to investigate the many circumstances of all forms of death. They can only do this effectively if they have reached a high level of competency. This competency can only be attained by having the desire and interest in this type of work, the necessary knowledge and training, and, of course, experience. A good death investigator is a good listener. The death investigator must listen to what people have to say. You must also be able to explain any information that has been developed. You must also possess compassion. Treat all people with consideration and respect. The death investigator has to have a great deal of patience, persistence and a positive attitude. These types of cases take time to investigate, some take years or even decades. Lastly, one cannot work in this gruesome vocation and expect to endure without a good sense of humor.

It is important that the death investigator have a plan of investigation. Although not all cases are the same, we can still preplan and be prepared. It is so critical that all police officers involved in a death scene know, understand, and follow their roles. This preplanning should include a strategy of approach, into the scene not only for the safety of the officers responding, but for the preservation of pertinent evidence. The protection of life is the most significant aspect of any type of police response. Once the scene is entered and secured, numerous photos should be taken immediately. These Polaroid™ pictures should be retained by the death investigator and used to assist the pathologist with the performance of the postmortem examination. The Polaroid photos provide the pathologist with an opportunity to observe the body's position and location when it was first discovered.

One major function of police at the scene is to gather and record the facts of the investigation. There are two equally important methods of gathering the facts. The first one is by observance, while the second is to listen to what is reported to you by other officers or witnesses. Be absolutely positive you fully understand what is told to you. It is far better to ask a question a second time and get the same answer, than

to accept as fact information that is not fully understood. At that point you must accurately record this information.

The death investigator should then review the scene. Look for the obvious observations first. Things such as apparent injuries that may give any immediate indication as to what caused the death. All observations made at the scene should be recorded immediately. This can be accomplished with the use of rough notes or utilization of a tape recording device. The death investigator should be attentive to even the smallest of details that seem like they would not matter in the long run. Upon completion of the review of the scene, 35 mm photographs and a video or videos should be made. After all photographs and videos have been made, then a closer on-scene examination of the victim should be completed.

The review process actually begins again with the complete review of the body. You should look for injuries or wounds. Look for items such as: scratches, broken fingernails, bite marks, blood, bruises, semen or gun powder. Describe in complete detail all observations. After all observations pertaining to the examinations of the body have been recorded, Polaroid photos of the victim displaying those observations should now be taken. Finally, 35 mm stills and videos of the deceased can be completed.

At this point, accurate measurements should be taken. The use of a chalk outline around the body can also be performed. The purpose of these measurements is so that the body can be removed from the scene, and yet for all intent and purpose it could be placed back exactly where it was located. After all measurements are taken, bag the hands and the feet by placing separate paper sacks over each hand and foot. These sacks should be secured in place with tape. This preserves any evidence that may be located there such as soil, blood, hair or skin.

The body is now ready for transport to the morgue. The coroner may check the body for identification and remove such items as a driver's license. If the pathologist is on scene he or she might examine the victim by removing items of clothing; however, there is no reason for any other item to be removed from the body. The body should then be wrapped in a white sheet and placed into a body bag and sealed. Note that nowhere in this chapter has it been written to place a cover over the body. Important evidence has been lost or contaminated by placing a blanket on a victim and then taking the blanket off for exam-

ination. The body, accompanied by a police officer for chain of custody purposes, should be transported directly to the morgue by a designated ambulance or coroner's vehicle. The police officer will then sign the body into the morgue.

Once the body has been removed from the scene, the collection of physical evidence can commence. In some agencies the death investigator may be charged with the responsibility of collecting evidence. Whether the death investigator is required to collect evidence or not, has no significant impact on the investigation. However, it is paramount that the death investigator has a complete understanding of all facets of the evidence related to a death investigation. The value of evidence and how it relates to the investigation often proves or disproves the type of death that may seem apparent.

Now that all observations from the scene have been recorded, preliminary examination of the body completed and photographs taken, and all the evidence having been collected, it is time for the death investigator to put his or her experience to work by analyzing the facts. The police investigator must focus on what type of death can be proved, the identity of the victim and the identity of the offender, if there is one. If an offender is suspected, the death investigator must also consider the motivation for the death and the progression of events leading up to the death.

It is suggested that whenever possible the police death investigator witness the autopsy of the deceased. Very valuable information can be ascertained from the findings of the pathologist. You should meet with the pathologist prior to the postmortem examination of the victim. Be prepared to answer any questions that might be asked of you concerning the investigation. It is important that the death investigator take the Polaroid pictures to the autopsy for the pathologist to review. Any other instruments that may have been used to facilitate the death, such as a gun or knife, should also be taken to the autopsy for the pathologist to review or compare to any findings. It is up to the death investigator to familiarize the pathologist with pertinent facts from the scene.



Figure 2.1. A function of the police death investigator is to attend the autopsy of all death cases that are to be investigated. Not only to provide pertinent information to the pathologist but also to learn more concerning how or why the victim died.

The autopsy examination however gory, is the victim's way of giving up information about how life was taken. When attending the autopsy, you must realize that this is a time to learn more about how death was brought about, or how or why it occurred. Forensic autopsies differ greatly from a general autopsy. In a general autopsy, the pathologist will look mostly for the cause of death whereas the forensic autopsy will not only be looking for cause but also the manner of death, as well as any other factors which might be involved. Unfortunately, forensic autopsies or postmortem examinations will

vary from one hospital to another, depending on the protocol of a specific hospital. Other information that should be provided to the pathologist, is the environmental temperature at the death scene and other pertinent data such as whether lights were on or off, if mail or newspapers were present, etc. Information should also be provided concerning environmental conditions such as weather, temperature, moisture, humidity and conditions surrounding the victim at the scene.

An important and yet difficult aspect that can fall under the role of death investigator, is that of death notification to the next of kin. Not all police officers are capable of responding to this situation. The death investigator must be ready for a variety of responses from the victim's family. People who are given notice that a loved one is deceased will react differently. Some people will drop to the floor or chair, while others will become combative and strike out at the individual bringing this devastating news. Some relatives will not want to view the victim, while others will wish to spend some final moments with their loved one. In many instances, valuable information can be learned during this initial contact. Family members may be less likely to discuss the victim or the victim's activity as time goes on. You must be sensitive, but you must also establish pertinent facts about the victim.

The police death investigator may be called upon to testify at a coroner's inquest or other legal proceedings. You must be prepared, should you be required to give testimony concerning the facts surrounding a death. Preparation can be in the form of reviewing all reports pertinent to the case. Be truthful and confident in your testimony. Your courtroom demeanor is also very important. Conduct yourself in a polite, courteous and professional manner. Give equal responses to both the prosecutor and the defense attorney. Do not let an attorney get you upset, keep emotions under control. Do not provide more of an answer than the question requires. If you do not know the answer to a question, say so. Coroners and prosecutors enjoy putting a well-prepared witness on the stand to present the facts of the case.

Lastly, the role of the police death investigator is to make the case. Determine the proper manner of death and seek an arrest and conviction in those cases where death was at the hands of someone else. **REMEMBER**, never compromise yourself or your investigation. Always conduct a death investigation right the first time, you may never get a second chance. The police death investigator is the only

representative that the deceased shall ever have. It is the responsibility of every police officer that investigates death to assist in training new investigative personnel. You must keep up-to-date on new investigative tools and techniques. A death investigator must maintain an objective approach while conducting methodical and systematic investigations.

DEALING WITH THE MEDIA

As a police death investigator, it may become necessary for you to deal with the media. You should cooperate as much as possible to create a win-win scenario. The media will consider it a win if they can obtain a story. You can win by providing selected information to the public. You need to be honest, brief and positive. It will also help to practice dealing with the media.

It is important to be prepared and know what you are going to say. Sometimes what you want to say and what you do say is not always the same. Often the media will approach you before you have had the time to get prepared. It is at a time like this that you need to excuse yourself for a few minutes and get prepared. You can say you have an important page to answer that may be related to the investigation, or you need to use the restroom. The media will wait for you, be assured.

When addressing the media, do not get angry or upset. Always conduct your media interviews on the highest professional level. You do not want to act overly friendly to the reporters, however, you do want to be courteous and respectful. Always return reporters telephone calls, even if it is late in your day. Do not make any comments that are considered "off the record." Your comment or remarks can appear in the news.

You should provide only facts that can be released. Keep press statements or answers brief. Do not give incomplete information. If only pieces of certain information can be released, then do not give out any of that particular information. Remember that it is not only possible to say too little, it is just as possible to say too much. Do not make your answers too vague, it will only call for additional questions by the media.

Most police death investigators consider it breaking a cardinal rule to leak or provide unauthorized information to the media.

Unfortunately, this type of unprofessional behavior has happened in the past and it will happen again in the future. The leaking of pertinent information about a death investigation can only hurt the investigation. This information can be leaked by other death investigators, other police officers, prosecutor's and the victim's family members.

Keep good eye contact with the media. Release only information that can be released; information that will not place the investigation in jeopardy. Avoid comments such as, "I don't know" or "No comment." Develop an organized pattern of news releases that is given each time that you address the media. It may be helpful to have your own recording of the news conference to be absolutely positive what information you did release.

CASE FILE REVIEW

It is the responsibility of the death investigator to insure that the complete case file has been put together and properly organized. This includes:

Police Reports

1. Initial call to police.
2. Initial police reports.
3. Follow-up reports.
4. Evidence reports or log sheets.
5. Photographs, slides, video and audiotapes.
6. Crime laboratory reports.
7. Notes, sketches, graphs and charts.

Autopsy Reports

1. Copy of morgue logbook.
2. Autopsy findings, protocol.
3. Photographs, slides, graphs and charts.
4. Reports of evidence recovery and transmittal for chain of custody.

Coroner's Reports

1. Inquest records, testimony and depositions.
2. Death certificate.

List of Names

1. All police personnel.
2. All medical, fire and emergency personnel.
3. All pathology personnel.
4. All crime laboratory personnel.
5. All coroner's office personnel.
6. All secretarial personnel that type reports.

Chapter 3

IDENTIFYING THE VICTIM

PERHAPS ONE OF THE MOST significant duties of the police death investigator is to establish the identity of the victim. Identification is the recognition of an individual as determined by characteristics, which differentiate that individual from all others. Identification is necessary so that a legal certification of death can be made. Furthermore, identification of the remains provides the corpus delicti for all subsequent legal actions. Once an identity is determined, additional leads for information can be developed. Information such as the victim's family or friends, or perhaps the victim's employment records or finances will provide additional leads. A check for romantic involvement or criminal records can be initiated.

Many times the victim can be visually recognized because the physical features have not been distorted by death or injury. In some situations the body can be visually identifiable for a short period of time. Within thirty minutes the body may no longer be recognizable due to postmortem changes. When a body is discovered you must make a thorough and accurate description immediately. Use your Polaroid® as soon as possible.

Methods used to establish identity are dictated by the postmortem conditions of the body. Discoloration of the skin and bloating of the body caused by gaseous decomposition may make the natural likeness distorted. Mutilation of the deceased may occur in several ways. Animals, aquatic life, boat propellers, fire or heat, explosions, trains, automobiles or other large moving vehicles can cause mutilation. An assailant, to hinder identification attempts, may deliberately mutilate the body. All of these forms of mutilation can make visual identification difficult if not impossible.

Bodies recovered from fires present extremely difficult problems in identification. Several artifacts can be noted in identification of the burned body. Bodies can lose several inches in height and 60 percent of body weight, giving a totally different appearance to the victim. Head hair can be burned off or hair color can change.

A complete description of unidentifiable bodies should include the following: approximate age, sex, race, height, weight, complexion, eye color and hair color. Additional summary of the face, ears, teeth, limbs, scars, marks and tattoos should be noted. Also include descriptive information about clothing, keys, jewelry, eyeglasses or hearing aids. Keep in mind that fingerprint and dental records may not always be available for use in identification.

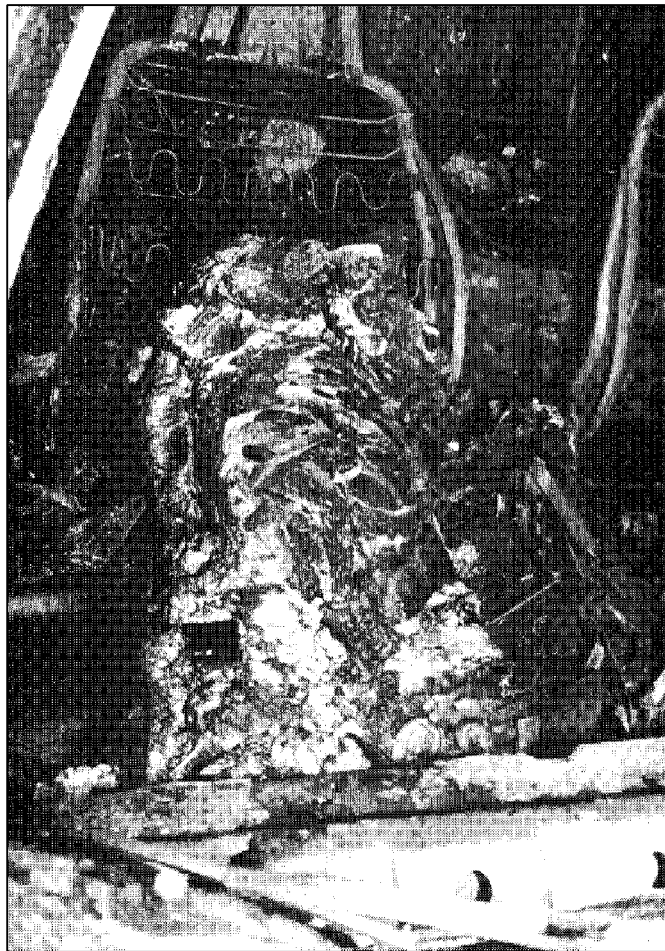


Figure 3.1. Positive identification of all victims is crucial. This subject was found in the passenger seat of a vehicle that had been set on fire. Identification in this type of death can be extremely difficult.

Law enforcement officers should be aware of the numerous problems with the unknown dead. Such bodies may be in a non-decomposed state, in a state of decomposition but with no bones exposed, semi-skeletal remains with very little flesh present, or totally skeletal without flesh. Likewise, the wearing apparel and other personal property found at the scene may be in varying conditions from new or undamaged to decayed beyond ordinary recognition. It is not unusual that bodies are mistakenly identified as a friend or relative by well-meaning but emotionally distraught people. For this reason the identification of the corpse is a very serious problem for the police death investigator. It is your responsibility to establish accurate identification of the body by the physical remains and other evidence in cooperation with the coroner, medical examiner or pathologist.

Identification Categories

1. Bodies that are not decomposed or mutilated, and can be identified visually.
2. Bodies that cannot normally be identified by visual means:
 - a. decomposed bodies (wet or dry floaters).
 - b. bodies burned beyond recognition.
 - c. bodies that are mutilated or damaged beyond recognition.
 - d. bodies that have been skeletonized by animal activity or through decomposition.
 - e. bodies that have been cremated.

Features Used in Identification

1. Complete description of the entire body, weight, height, tattoos, scars and deformities.
2. X-rays, old injuries, abnormalities of bones, bullets and other foreign matter.
3. Complete dental evaluation.
4. Complete blood grouping, typing and DNA.
5. Fingerprinting, palm prints and footprints.
6. Complete skeletal examination. Useful in determining sex, race, age and stature, usually lacks positive identification data.

7. Hair studies.
8. Smears of cells for sex identification.
9. Careful examination of personal effects.
10. Various foreign objects in the body, wire structures, pacemakers or prostheses.
11. Distinctive disease process.
12. Identification by circumstance.

Identification Procedures

1. Photograph facial features. If identification cannot be established, the following procedures need to be completed.
2. Obtain finger and palm prints, and footprints.
3. Obtain full dental examination.
4. Have full body x-rays taken.
5. Note any injury, or surgical scars.
6. Note any deformities, or amputations.
7. Note any birthmarks.
8. Note any warts, moles, or tumors.
9. Note any tattoos.
10. If body is skeletonized, determine sex, race, approximate age and individual characteristics.

Chapter 4

CAUSE AND MANNER OF DEATH

I THINK THAT THE FIRST ITEM that needs to be addressed is just what is death? When you are dead, are you dead? Today doctors, lawyers and judges argue over at just what point you are dead. In early times, death occurred when you stopped breathing. Now questions arise about life support systems and the use of the term *brain dead*. Whenever I am discussing the finer points of being dead, I recall the phrase Dr. Grant C. Johnson had used so frequently, “Obviously and Irrevocably Dead.”

The police death investigator has three procedures at hand to assist in making a determination if life is present. Any of the three can be utilized. Perhaps the simplest method is to check for a breath. This can be done by observing the victim’s chest. Look closely for a few moments, any breathing can be observed by the rising and falling of the chest and abdomen area. If this cannot be observed, then the victim is not breathing or breathing is very shallow. Shallow breathing can be very difficult to detect. Remember, that lack of breath does not indicate that the victim is positively dead.

The second technique that can be employed to determine if life is present, is checking for a pulse. You can check the pulse by using the tips of your fingers. Your fingers can be placed on the inside of the wrist, or along either side of the neck or throat. If the victim has a heartbeat, then a pulse can be felt. No pulse would indicate that death has occurred, it certainly is indicative that the person is not breathing.

The third observation that can be accomplished is to check the eyes and the changes in the pupils. Since the eyes are extremely sensitive tissues, if life is present some activity in the eye should be noted. Death will cause the eyes to dry out and lose muscle control. If the eyes are

open at the time of death, they will not close. The shine in the eyes will be gone. The pupils will no longer respond to light.

It has often been said that police officers do not have to make the determination if someone is deceased. However, more than once in my career I have had to make that determination. When I arrived on a scene where the person was obviously irrevocably dead, I still requested the coroner and paramedics. Every police officer needs to fully understand that at some point in his or her career they will get a call to respond to a victim possibly deceased. More times than not, a police officer will be the first person on the scene. You will have to make the call.

I recall when I first started teaching death investigation classes to police officers. I would ask how many officers would touch a dead body. Usually more than half would say that they would not. It is important that when you arrive and the area is safe, you need to check the body. Check the body for a pulse, and to see if the body is warm or cool to the touch. The lack of pulse would give some indication that the person might just be deceased. The warm or cool touch could be an indication of how long the individual has been dead. Depending on your department procedures, it would most likely be best to request paramedics or EMT to check the victim for any vital signs of life.

The final word on the time of death is the responsibility of the medical examiner, or the coroner. Even though they may never show up at the scene, it is ultimately up to their respective offices to set the time of death. Often the time of death is set at the time the body was discovered. Any movement or removal of the body should only be done under the direction of the M.E. or the coroner. As stated earlier, an important part of the investigation is teamwork. As a police officer you may have the least say-so at a death scene. However, if you or your department are going to be responsible for the investigation into how this person died, then you need to be satisfied with what has been done at the scene before you allow the body to be removed. Once anything in the scene has been altered, you cannot put it back without some possibility of error. Be sure you have everything you need. The statement that the body belongs to the coroner and the scene belongs to the police is only partially correct. A more accurate statement, would include the phrase, "The body is in the crime scene and therefore is a part of the crime scene."

As soon as death occurs, changes in the body begin to take place.

These changes do not happen all at once. There is some time relationship between death and the changes that will come to pass. Not always do we know the precise time of death. These changes can assist us in determining a range of time that death could have occurred. Time of death is one of the most crucial elements in any death investigation. However, as you will learn there are no hard rules in determining an accurate time that death took place. There are two terms that are important for a death investigator to understand before we delve into the actual investigation of the dead. The terms “Cause of Death” and “Manner of Death” are synonymous with death investigation; however, they hold two totally separate meanings.

Cause of Death

The cause of death is defined as a disease or injury, which directly or indirectly brought about death, brief or prolonged.

Manner of Death

The manner of death is defined as a legal matter that requires an expression or opinion of a medical examiner or a coroner's jury. Fashion in which cause of death occurred; homicide, suicide, accident, natural or undetermined.

Mechanism of Death

A physiologic derangement or biochemical derangement produced by cause of death which is incompatible with life.

The police death investigator should focus on the manner of death. Determining cause of death; the disease or injury which directly or indirectly brought about death, is the responsibility of the medical examiner or the coroner. There are five types of death that may be considered as the manner of death that police officers should be concerned with, natural, accident, suicide, homicide and undetermined. It is the job of the death investigator to help prove or disprove which manner of death is related to each victim by determining what caused the death. It is imperative that the death investigator realize that any manner of death can masquerade as another. This especially holds true when neither the cause nor manner can be determined. Death can

take place under certain circumstances that give false indications as to the manner of death. It would be extremely difficult to prove a murder that never happened.

It is pretty much the standard now, that all investigations are worked down and not up. What this means is a death investigation should be worked as a homicide until homicide can be ruled out. The case should then be investigated as a suicide until suicide can be disproved. Lastly, work the case as an accident and from there as a natural.

Never work an investigation from natural to a homicide, too much evidence may be lost. **REMEMBER**, any manner of death can masquerade as another form. The police death investigators may find themselves in an impossible situation trying to determine the actual cause of death if the correct manner is not determined. It is sad to say that if mistakes are made in a death investigation, people who commit murder may never be held accountable for their horrible deeds. You are now the only representative the victim will ever have.

Chapter 5

ESTABLISHING TIME OF DEATH

IT IS PARAMOUNT THAT THE closest time of death be learned from your death investigation. It will help in determining the sequence of events leading up to and including that time when death occurred. As written earlier, changes in the body after death may be used to help assist in determining the time of death. One key element that all death investigators must always keep in mind, is that due to different environmental conditions there are no hard and fast rules. These changes after death can only provide a basic guideline for death investigators to work with. Usually the time of death is just an estimate on the basis of the interval between the times that the individual was last known to be alive and when the body was first found. Although the exact time of death may not be precisely pinpointed, at least a range of time that death occurred might be established.

BODY TEMPERATURE

In a living being the metabolism of the tissues generates heat which is very tightly regulated by the body to a narrow range. After death this heat production ceases and the body cools to the approximate ambient temperature. Normal body temperature is 98.6 degrees F. Normally there is a one-hour lag period immediately following death where the body temperature remains fairly stable. After one hour, the body temperature will cool at about one and one-half degrees per hour. However, the body temperature is a narrow range, not a fixed temperature. Activity, illness, the decomposition process, infection, drug intoxication (specifically, cocaine), and absorption of heat can

maintain or raise body temperature after death. The body cools by radiation, convection, and direct transfer so that any factors that influence heat loss affect the rate. The environment will have an effect on body temperature. Other factors such as the victim's clothing, if the victim was sick or running a higher temperature, will also have an influence in the rate of lost body temperature. The victim's activity prior to death will also affect the rate of body heat loss. If the victim was involved in any form of strenuous activity heat loss will be affected. Careful consideration of the scene, must be considered in interpreting cooling rate. Was the victim located in open air or water? The victim's size and clothing may also affect the cooling rate.

The most reliable temperature readings are obtained from the rectum without interfering with the body. Temperature readings from the liver, after introducing a thermometer through an incision, are also dependable. Unless specifically trained by a medical examiner or by a pathologist, police officers should not take liver temperatures. Liver temperature is approximately 99 degrees F. Oral temperatures are not recommended.

LIVOR MORTIS

Livor mortis is known as lividity. Lividity is caused by dilation of blood vessels, and settling or pooling of blood in these vessels. Lividity can be noted within minutes of death, but can go unnoticed for a couple of hours. Livor mortis can be mobile for a short time; it then passes from the vessels to the tissues. Once the blood enters into the tissues, lividity becomes "fixed." Normal fixation of livor mortis takes about eight to 12 hours. Prior to this fixation period, lividity will move with any movement of the body. Applied thumb pressure will push the blood away if lividity is not fixed. Livor mortis when fixed is permanent. Lividity gives off a purple discoloration, this is due to the blood no longer receiving oxygen. Bodies that have lost a great deal of blood may show little or no sign of livor mortis. Lividity may be a substantial indicator of the position of the body and objects with which it was in contact with. Pressure against an object may partially be responsible for creating a postmortem mark, which could be misinterpreted as a wound. You should always check the body to insure that the lividity

is appropriate. An example of inappropriate lividity would be if the victim was lying face down and the lividity was present on the “backside” of the victim.

RIGOR MORTIS

The term rigor mortis interchanges with rigidity. Rigidity is a well-known phenomenon. Rigor mortis is the process whereby the skeletal muscles enter a temporary period of rigidity due to chemical changes after death. Muscle cells work because of a product in the body called lactic acid. The living body can control the lactic acid, the dead body obviously cannot. When death occurs high levels of this lactic acid form in the muscles. In the time just prior to death high metabolic activity such as exercising, aerobics, swimming, or running, leads to higher levels of lactic acid. Higher environmental temperature also leads to a shorter response time. The general rule of the onset of rigor mortis is that it will begin about 20 minutes after death. I have found that the best way for me to remember the changes due to rigidity is the 12-hour rule. Rigidity takes about 12 hours to be complete, will be present for 12 hours, and begins to disappear in another 12 hours. Rigor mortis will be gone in 60 hours. Always remember that rigor mortis is temporary. Rigidity appears to start at the head and work its way down the body; however, rigor mortis actually starts in the shorter muscles in the face first. It then moves to the longer muscles. Rigor mortis develops in the position the body is in. The death investigator should always check the body to see that the rigidity is appropriate. The environment may greatly influence the development of rigor mortis. The onset of rigidity will be delayed in cold temperatures, emaciated individuals, individuals with chronic disease, and those who are grossly obese.

POSTMORTEM DECOMPOSITION

Postmortem (after death) decomposition is greatly affected by environmental conditions. Internal organisms in the intestine become very active and start multiplying and decomposition begins. First the intes-

tine and the blood will be attacked. When gas formation leads to the ruptures in the body, other organs will be attacked. Organs start decomposing at different times after death. Due to the destruction of body tissues by bacteria, usually from the intestinal tract, the body will alter and change greatly. These changes will be in the appearance of decay or decomposition. Alterations include the following: skin discoloration, the bloating and swelling of body tissues, blood and other body fluids purging from the body openings, putrid odor, skin blisters and scalp and skin slippage.



Figure 5.1. This photograph illustrates postmortum changes. Note the discoloration, bloating and skin slippage.

As mentioned, one obvious change will be indicated by change in color. First evidence of color change is a greenish discoloration in the lower abdomen region. This is followed by a greenish coloration over the entire abdomen. Also observed are interconnecting purplish lines called marbling. Eventually the entire body will have this grayish-green red discoloration. This particular coloration of the decomposed body takes about seven days.

Gas formation tends to begin at roughly the same time as discoloration, usually around 36 hours. The gas formation will produce skin blisters and skin slippage. Generalized swelling of all tissues with protrusion of the eyeballs and tongue occurs. Bloody purging from the mouth and nose can be observed due to rising internal pressures brought about by the gas formation. In about three weeks body cavities will rupture.

LATE POSTMORTEM

Late postmortem decomposition of the body can be divided into several stages, even if the duration of each stage varies considerably. Decomposition is said to be affected by cold and warm temperatures. Cold delays the decomposition while heat increases it. Therefore, the hotter the environment, the quicker the rate of decomposition. Decomposition is thought to develop at a quicker rate if exposed to air than if in water. However, decomposition develops faster in water than in soil. The death investigator should be aware of three types of late postmortem changes. Each is significantly different because they are influenced by different factors.

Three Categories of Postmortem Changes

Putrefication: Caused by bacterial growth in the body. Shows a definite discoloration of the skin. Skin slippage as well as scalp detachment can be observed. The body will also begin to purge fluids from within the body. Bloating that occurs can make the body two to three times its normal size. It would not be unusual to see this late state of decompo-

sition in as little as 12 hours. All of these factors make positive identification extremely difficult.

Mummification: This aspect of decomposition is brought on by lack of moisture. The skin will shrink, giving the false indication that fingernails or hair is still growing. Once all the moisture and fluids are purged the body will dry out and become very leathery.

Adipocere: The body being in water or damp soil brings on this form of decomposition. Again, the rate of decomposition is slower in water or soil than in the open air. As the body decays it takes on a soapy-like appearance. Adipocere can develop in about three months and can remain for several months up to a year.

Case History 1

In one weekend I had two unrelated death investigations where the bodies were found within one mile of one another. It was a Saturday in mid-August when the body of male in his seventies was found in a nearby river. He had been missing for approximately seven months. On Sunday the body of a female in her thirties was found in a cornfield. She had been missing for approximately seven days. Both victims were very similar in late postmortem decomposition. As stated previously, the rate of decomposition is slower in water than in open air. Being in the direct sunlight and the hot summer heat, the female displayed skin slippage and scalp loss, just as the elderly male exhibited having been in the water for seven months.

Case History 2

On a Friday night in July I saw a friend that was a casual acquaintance. On Monday when I was sent to his house, I observed that the house was filled with flies. Upon making my way to the second floor of the home that had no insulation or air conditioning, I observed the same friend that I had seen less than 60 hours ago on Friday. He had one bullet hole to the right temple region. He was bloated to three times his normal size and exhibited skin and scalp slippage. His skin was marbled with green streaks throughout. There was bruising in the face area. I would not have recognized him had I not known that this was his house.

The death investigator needs to be aware that bodies that are exposed to the outdoor elements are subject to postmortem artifacts. Not only will insects feed from a corpse, so will small animals such as foxes, possums, or raccoons. These small animals will eat on the tender portions of flesh. The soft area of the neck is a prime location. This feeding by these animals in the neck area, combined with decomposition, can cause the head and the neck to become detached from the rest of the body. Do not think just because the head is not attached that it is associated with a cutting wound.

FLY LARVAE

After years of removing hundreds of badly decomposed bodies from fields, houses, automobiles and along roadways, I feel that fly larvae should be included in this chapter. In most cases, an entomologist who studies flies, maggots and beetles can, with a significant amount of information collected from a scene, provide the most accurate time of death, as compared with any other factor of postmortem changes. It is with this in mind, that fly larvae is considered in determining time of death. Although a little repulsive, we must keep in mind that maggots are a death investigator's friend. Blowflies will lay eggs in various body openings such as the lips, eyelids, nose, mouth, and in other exposed body orifices just after death or even a short time before death. These fly eggs will then hatch into maggots within about 24 hours. The maggots then feed from the corpse. Since fly activity changes with cooler temperatures and rainfall, these things must be noted if a submission to the entomologist is anticipated.

Due to the various stages of growth referred to as instars, it is imperative that the death investigator collects a sample of all larvae that can be located. The ideal sample would include the oldest to the youngest. It is also necessary to collect the pupa. This pupa resembles rat-like droppings. It is important to understand these stages.

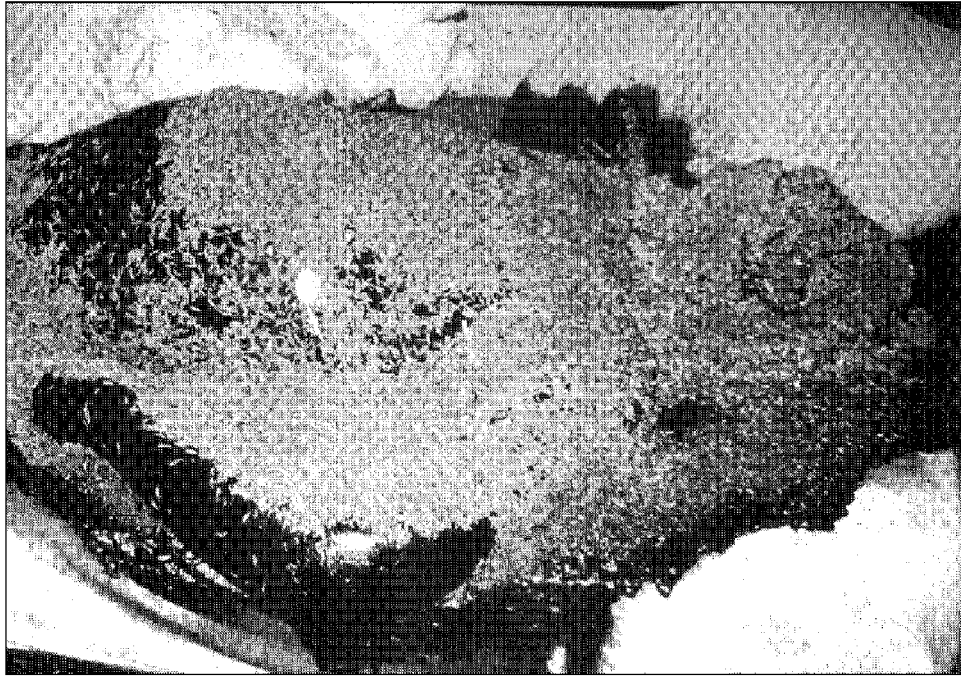


Figure 5.2. The victim has been fully enveloped by maggots. The maggots were used to assist in determination of time of death. The maggots can be very useful.

Stages

1. The blow fly lays the eggs.
2. The eggs hatch into maggots.
3. Maggot encloses itself in a hard brown shell, called pupa.
4. Fully grown flies hatch from the pupa.

Maggots have also been used to do toxicology on a body when no other fluids were available for testing. The maggots are collected and placed into a blender and liquefied. This liquid can then be screened by toxicology. Certainly, in the case of these maggots “you are what you eat.” It would certainly be beneficial to have a contact entomologist. The entomologist can provide information to you on how to collect and preserve specimens to be submitted for examination. The entomologist will need several samples, some fresh and others stopped at their current life cycle. Ask the entomologist how he or she wants them collected, both alive and dead. The entomologist will also need

to know about previous weather conditions covering the suspected time of death.

Entomology is certainly one area from which any death investigator could learn a great deal of important and useful information. Develop an entomologist contact before the need arises. The entomologist can provide you with the complete history of forensic entomology. The entomologist can also assist you with the recognition of the types of insects that might be found in your geographic area and which species you may need to collect. There are numerous species of flies; however, only a certain variety need to be collected. Likewise, there are many categories of beetle, some are significant and others are not. The entomologist can inform you on how to collect, what to collect, how many to collect. The entomologist will need some fresh and some preserved collections and will direct you as to how to prepare the collection for transport and where to send them.

Information that you will need to provide to the entomologist will be the temperature at the scene and the time at which temperature was taken. The date and time insect specimens were collected (fresh and preserved). The temperature of the body between the time of removal from the scene and the collection of the specimens. The entomologist will also need information that relates to the range of temperatures for some previous determinate amount of time (two weeks).

Case History 1

In studies that I have conducted, these maggots appear to go into a feeding frenzy. During this feeding frenzy, higher air and soil temperatures were recorded close to the body. The maggots generated heat which would accelerate decomposition. Since maggots can jump and climb trees, a check of the immediate area should be done for sample collections. In observing tests conducted with dead pigs, whose viscera is similar to a human, a blanket was used to cover one pig. The maggots in their feeding frenzy appeared to move the blanket from the pig to expose the flesh.

Case History 2

A deceased male infested with maggots was brought to Memorial Medical Center for autopsy. The man was covered by the maggots to such a degree that you were able to make out his arms and face only by searching the body's outline of the feeding maggots.

Time-of-Death Aspects

The only accurate method of determining the time of death is to be there when it happens, and even then you have a small range of error. There is currently no singular accurate marker of time of death. The closer to the actual time of death, the more accurate is the opinion that can be determined from the scene and markers of death. The experience and caution of the police death investigator combined with the classic markers and a well-established window of death, can lead to a possible range of death. To determine the probable range of death, first establish a window of time that death could have occurred. Determine when was the deceased last known to be alive and when was the body was found. The difference is the range of time whereby death could have occurred. Use those scene markers that allow some positioning of the death within the window by the following: mail, newspapers, phone calls, meals eaten, place and state of dress. Adjust the preliminary opinion by additional data that can be gathered about the victim. Consider environmental factors and circumstances that may have changed. Use observations of the degree of rigidity, amount and position of lividity, body temperature, presence of fly eggs or larvae. Use considerable caution on time of death determinations, as there can be factors that markedly enhance or retard the chemistry of death and the body's changes. Don't attempt to make your opinions more accurate than the data allows.

Stages of Postmortem Decomposition

1. Blue green discoloration of the skin (24-36 Hrs.)
2. Marbling, green-black discoloration
3. Bloating (36-48 Hrs.)
4. Entire body decomposition (60-72 Hrs.)
5. Skin Slippage (4 -7 Days)
6. Adipocere
7. Mummification
8. Skeletonization (Weeks to years)

Environmental Factors

Factors Influencing Postmortem Decomposition

Temperature

Humidity

Location (indoors or outdoors)

Clothing

Heat increases rate

Cold decreases rate

Insects and soil work from outside in

Microorganism work from the inside out

Stomach Contents

Stomach empties in 2-6 hours

Small bowel empties in 2-6 hours

Chapter 6

CAUSES OF DEATH

ASPHYXIA (LACK OF AIR)

A BROAD TERM REFERRING to the set of conditions characterized by the interference with the utilization of oxygen. Two specific forms of asphyxia can be demonstrated. The first would be mechanical asphyxia and the second being chemical asphyxia.

HANGING

One form of asphyxia would be hanging. The asphyxia is caused by compression of the neck from the weight of the body. Hanging can be an accident, suicide or homicide. Hanging needs to be investigated fully so that the correct manner of death is determined. It is important that the noose never be untied. The noose should be cut away from the knot. Tie the two ends of the noose together with string, thus preserving the contour of the knot. Hanging occurs if the pressure exerted on the neck is enough to compress the neck structures. It is not necessary for the body to be fully suspended. Loss of consciousness can occur in less than 2 to 3 minutes if the airway is obstructed.

I can't recall if someone told me or if I read it somewhere, but I was always under the impression that it was not unusual for family members to cut down their loved ones and place them in bed. Thus attempting to disguise the hanging as a natural death. I had never seen this particular scenario until one day. I responded to a home where an elderly gentleman was reported to have been found dead in his sleep. It might have been believable except for the large furrow around his neck. The family later admitted to having cut the man down, dressing him in pajamas, and placing him in bed, prior to calling the police.

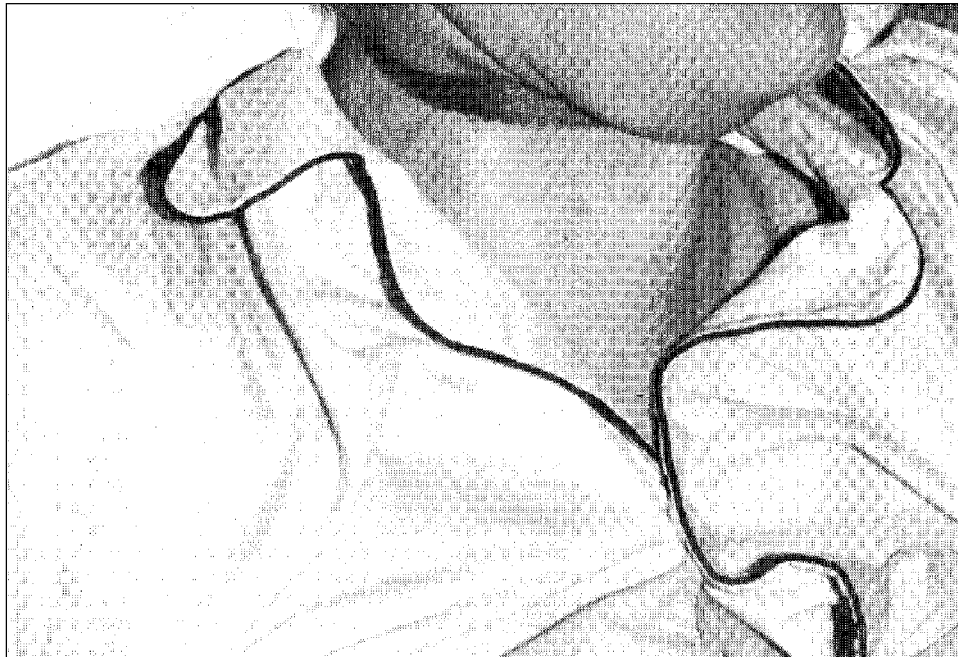


Figure 6.1. The victim was reported to have been found dead of natural causes, in bed and dressed in pajamas. Examination at the scene, revealed a rope furrow around the neck, indicative of hanging.

Ligature marks or furrows can usually be readily recognizable. However, this evidence may be absent if soft or padded material was used. Expect to find similar artifacts and decomposition effects as with ligature strangulation. Also in the face and feet or ankles small pin-like hemorrhages may be seen. These spots are referred to as Tardieu spots. A finding of Tardieu spots is not always indicative of asphyxiation; it can be observed in several other forms of death.

STRANGULATION

As with hanging, strangulation can be an accident, suicide or homicide. This form of asphyxia, is due to the application of force to the neck. Strangulation is broken down into; manual, ligature and yoking. Examination of the neck may provide evidence of the type of the material used or even finger marks. Where lack of air in hanging is the

compression of the neck by the weight of the body, strangulation is compression of the neck manually or with the use of a rope or other type of ligature.

Manual Strangulation

Will produce findings such as: nail marks, bruising and internal neck trauma.

Ligature Strangulation

Will produce the imprint of the ligature that may be patterned. This can rapidly disappear during decomposition. Expect to find internal neck trauma.

Yoking

Caused by compression of the neck by using the forearm. Usually will not be able to note trauma to skin. May develop neck bruising in postmortem interval of 12-36 hours.

SUFFOCATION

The prevention of breathing by the blocking of airways is another form of asphyxiation. Sometimes referred to as smothering. Smothering can be accomplished by placing a hand or other object over the nose and mouth. Another form of suffocation would be the use of a plastic bag placed over the head, diminishing the flow of oxygen. The concept of placing a bag over the head is used not only in suffocation, but has also been found in the deaths of persons sniffing glue or other compounds.

In all suffocation cases, especially in infants and the elderly, it is important to check for damage to the frenulum. The frenulum is that cord on the inside of the mouth between the gums and the upper lip that can be felt by the tongue. The frenulum can be damaged during suffocation.

SEXUAL ASPHYXIA

In all these types of asphyxia the possibility of sexual activity must be considered. A sexual perversion called autoerotica occurs when the participant desires to produce a level of cerebral hypoxia by shutting off the intake of air. The premise behind this practice is to heighten sexual satisfaction by going to the point of passing out, then releasing whatever mechanism they are using to restrict the flow of oxygen. This sexual asphyxia, predominately practiced by males between the ages of their early teens to their thirties, is rarely performed by females. Victims of this form of asphyxia may be found fully clothed in their clothing, dressed in women's clothing or totally nude. The presence of sperm is not totally indicative of this type of behavior. Keep in mind that sperm can be present on the male victim of a gunshot wound; therefore, the finding of sperm is not always indicative of sexual asphyxia. It is not unusual to find indication that the victim was attempting or succeeded in masturbating.

The victims of this type of asphyxia will normally be found in an isolated location. Expect to find erotic literature or sexually explicit photographs in the immediate vicinity. Additional scene investigation may reveal evidence that this type of activity has been performed before. Other evidence that the police death investigator should be looking for is an escape mechanism from the ligature or from bondage devices. Evidence of protection to hide activity may also be apparent in the scene.

Autoerotic Fatalities

Autoerotic fatalities are deaths that occur during masturbation. The person may die of natural causes while performing masturbation, or death may be brought on by the use of some type of injurious agent. The euphoric or intoxicating gases that are inhaled during sexual activities can produce death. The manner of death in these types of autoerotic fatalities is asphyxia. These types of deaths can be erroneously thought to be suicide. The euphoric state is created by the use of certain types of gases to replace oxygen. One form of gas that has been widely used is nitrous oxide. There are many gases that can be obtained that will produce a hypoxic state. Another form, fluorocar-

bon, can be found in aerosol spray cans. It has been determined that fluorocarbons can cause heart attacks when high concentration levels are induced into the body. Chemicals used to enhance the joys of sex are often referred to as aphrodisiacs. Different forms of aphrodisiacs can be found advertised over the Internet and in magazines.

Types

1. Asphyxia, compression of the neck, chest or abdomen
2. Cardiac
3. Toxic agent
4. Electrocution

Victim Profile

1. Caucasian male 9-30 years of age
2. 40% married
3. Middle class

Implication

1. Manner of death is ***ACCIDENTAL***

CHOKE

Blocking of the internal airway by a foreign object. The object is generally inhaled, but due to its large size it is impacted in the airway. The victim can generally exhale but cannot inhale. Implication as to manner of death is that of accidental.

TRAUMATIC ASPHYXIA

Breathing is hindered by external chest compression by extreme pressure. Scene investigation should establish what happened. This form of asphyxia can be caused by situations such as having a vehicle

fall on the chest, or being buried by falling masonry or dirt from a deep trench collapse. Another situation might be from a stampede or by a large crowd pushing forward during a concert or sporting event. In this form of asphyxia look for the head to be filled with blood.

Chapter 7

ASPHYXIA BY POISONING

POISONINGS CAN BE A HOMICIDE, suicide or accident. It is rare to find a homicide as a result of poisoning. Nevertheless, if the police death investigator is to be certain that death was not a homicide from poisoning, it would be reasonable to investigate all poisoning cases as homicide until proven to be caused by suicide or accident. Perhaps homicide by poisoning has become a lost art. The practice of poisoning one's enemies was once thought to be so significant that families of royalty often had servants that had no other responsibility than to be tasters of food.

Determining if a person has died as a result of homicidal poisoning can be one of the most difficult types of homicide to prove. Evidence of poisoning is obtained from having an indication of the symptoms of the victim prior to death. The postmortem examination of the body and the isolation and identification of the poison would be of significant evidentiary value.

Unfortunately, there is hardly any symptom of poisoning which cannot be caused by disease. However, there are conditions of symptoms which provides some indication of poisoning. The onset of certain symptoms and rapid death can be strong evidence of poisoning. Poisons such as arsenic, strychnine, and narcotics can produce similar symptoms as do disease to certain body organs or infections.

In this type of investigation you must gather as much evidence as possible. All substances, foods and drinks should be collected. Determine when the last meal was eaten and if others became sick from eating the same food or drink. Ascertain the state of health of the victim before becoming ill. Find out if the victim has ever tried to commit suicide. The findings of the pathologist and the toxicologist are extremely crucial.

The pathologist will be able understand the effects of certain poisons from the postmortem exam. Acids and alkalis may cause extensive burns around the mouth or surface of the body and do severe damage to tissues. Metallic poisons will cause profound destruction to the intestinal tract, liver, or kidneys. Phosphorus causes a degeneration of the liver. So often in poisoning deaths the pathologist's examination will show that death was not a cause of natural death or traumatic injury. There is no evidence for death other than that of poisoning. Most poisons and drugs do not produce characteristic pathological lesions and can be only established in the body by toxicological analysis. Toxicology is an important avenue in many types of death investigations. In order to obtain a successful prosecution of homicide by poisoning, the police death investigator must be able to establish several factors. The police death investigator must determine or the motive for the crime, the perpetrators, accessibility to poisons, if the assailant was aware of the lethal effects, and if he or she had an opportunity to disperse the poison to the victim. As was indicated murder by poison is certainly not as common as suicide.

Poisons can be classified into several categories by chemical characteristics. One would need to have a strong educational background in chemistry to fully understand the characteristics of all the categories. Included in this chapter are several examples of poisonings that the police death investigator will most likely be asked to investigate. This is one area of death investigation that the death investigator will need to rely heavily on other forensic specialists. Included in this forensic group is pathology, toxicology and chemistry.

Perhaps the most common aspect of poisoning that law enforcement will deal with is death due to carbon monoxide poisoning. As stated earlier in Chapter 6 there are two specific forms of asphyxia. Cited was mechanical and chemical asphyxia. Carbon monoxide, although associated with the chemical form of asphyxia, is a poisoning as far as a cause of death determination. Carbon monoxide as a poison falls into the category of gases. There are numerous gases that are proven to be very poisonous. New gases that are poisonous can be developed by anyone at any time. The big fear during the Gulf War was the manufacture of gases that could be released upon U.S. troops. At the time of this writing the government is still attempting to determine what those troops may have been subjected to during their tour of duty.

CARBON MONOXIDE POISONING (AN ASPHYXIA)

Lack of air in this instance is caused by red corpuscles not being able to carry oxygen to the body's tissues and returning carbon dioxide to the lungs. Carbon monoxide is odorless and colorless. The hemoglobin has an affinity for carbon monoxide 250 times greater than oxygen. Levels of carbon monoxide are determined from the hemoglobin. Fatal levels can be at 40 percent. These fatal levels can be affected by age, young or old, and the use of alcohol or drugs. Death resulting from carbon monoxide poisoning can result within minutes. The body will develop a bright cherry-red color.

The incomplete burning of carbon-based materials causes carbon monoxide. It is found in fires and exhaust from automobiles. Carbon monoxide poisoning can be an accident, suicide or homicide. Although I never had a homicide by carbon monoxide, I investigated several cases that were suicide and an equal number that were accidents. Accidental carbon monoxide poison cases that I investigated always happened in the winter. These accidental carbon monoxide deaths fell within two specific areas. The highest number of deaths being associated with victims who started their vehicle to warm it up without proper ventilation. More than one victim started their vehicles and left them running before opening the garage door. They were found in places such as the house attached to the garage, in the front seat of the car balancing their checkbook, and even with their hands on the overhead door of the garage.

The other area of investigations of carbon monoxide deaths were associated with faulty fireplaces or furnaces. Something as simple as a dirty fireplace flue can cause carbon monoxide poisoning. Ironically, in some instances where there were several people in the house only some were affected by carbon monoxide. Several different investigations indicated that carbon monoxide affects the very young; the elderly; persons with coronary heart disease, respiratory problems, chronic lung disease; and by the use of alcohol or drugs. It was also learned that people who slept further from the fireplaces were less affected.

While investigating suicides by carbon monoxide, I have noted that some people will go to great lengths and resourcefulness to fabricate an apparatus to deliver the carbon monoxide. Some victims created a

carbon monoxide delivery system that apparently took a great amount of time to create. All it really takes is starting an internal combustion engine without ventilation.

The carbon monoxide in the blood is reported in terms of hemoglobin saturation. The following are comments relative to the level of carbon monoxide in the blood and body effects:

1. Most normal cases have a carbon monoxide level of less of 5%.
2. Smokers may have up to a 10% or more carbon monoxide in the blood.
3. Levels of 15% may disturb vision and judgment.
4. Levels from 20-30% may be associated with headache and nausea.
5. Levels above 50% are usually fatal.

Case History 1

Receiving a call to respond to a rural location on a cold December day, I arrived to be informed that this was a carbon monoxide-related death. Upon my arrival, I observed a one-vehicle garage separate from the house. In the garage the victim, a 24-year-old male, was lying in the seat of his pickup truck. The vehicle had been running until the gas tank was empty. The victim had a blanket and a pillow. This scenario typically indicated suicide by carbon monoxide poisoning. Additionally, it was learned from the family that the victim had been undergoing some financial problems. The coroner's office was ready to rule the case as suicide. In an interview with the victim's mother, who was positive that her son had not committed suicide, provided information that her son had been getting severe headaches ever since the weather had turned cold. Intrigued by this I returned to the house. Sitting in the house for about an hour I began to suffer a really painful headache. Taking a camera and crawling under the house, I could observe the gas furnace. The pictures that I took revealed that the victim's furnace had a cracked heat exchanger. A local furnace repair man told me that this problem would cause headaches. It was thought that the victim, not being able to withstand the headache, took his blanket and pillow and went to sleep out in his truck. It is also believed that the victim started the truck in the garage to keep warm during the cold December night. There was not an adequate amount of ventilation to remove the carbon monoxide. The coroner's jury ruled the case as an accident.

CARBON DIOXIDE POISONING (AN ASPHYXIA)

The elimination of oxygen is asphyxia. Like carbon monoxide, carbon dioxide is associated to asphyxia; however, as far as the cause of

death ruling, it is shown as poisoning. This asphyxia may be caused by a build up of carbon dioxide in a small sealed space. This results in reduction of oxygen by rebreathing. Basically the body takes in oxygen by breathing or inhaling air. The body then releases carbon dioxide by exhaling the used oxygen. When in a closed or sealed area the body is unable to take in oxygen, thus rebreathing the carbon dioxide.

In this situation the carbon dioxide (CO_2) levels rise while the oxygen (O_2) levels decrease. Classic examples of carbon dioxide poisoning cases would be those instances where victims have been found in a closed refrigerator. Scene investigations of this type of death become increasingly important when it is realized that carbon dioxide accumulates after death. It would be significant to make an air collection sample at the scene for analysis for carbon dioxide content.

Carbon dioxide deaths are uncommon for several reasons. Today most laws require doors of refrigerators removed before disposal. Prior to this, small children playing hiding games were frequently found dead of carbon dioxide poisoning. Keep in mind that carbon monoxide is heavier than air. In order for CO_2 to be fatal it must be in high concentrations.

Victims of carbon dioxide experience rapid loss of energy and strength. Therefore they are unable to get themselves out of this environment even though they are aware of the urgency to do so. The scene may give the appearance that the victim could have gotten out if he or she wanted to. This is not the case due to the rapid loss of physical ability; the victim is unable to attempt an escape effort to get free.

Almost any substance when taken into the body in an abundance can produce serious illness or death. However, it is not always the case that a substantial amount of a poisonous substance need be taken to be fatal. Obviously, there are some substances that only a thimble amount of will produce death. Some clues provide very few investigative leads as to the participation of a substance in bringing about death.

Other categories of poison that must be considered by the death investigator are those of chemical compounds, corrosives, metallic or organic compounds. Certainly this is an area where most death investigators will have very little, if any, expertise. Again, it is so important that law enforcement have the highest level of confidence in other forensic specialists. Death by poisoning provides a high degree of difficulty for the death investigator, and he or she must work closely with these forensic experts.

Remember, there are so many different compounds which are lethal if ingested. The toxicologist has a limited amount of material on which to perform an analysis. Therefore, it is important that the death investigator provide the toxicologist with as much information as possible concerning the pertinent facts of the case. This should include any poisons that may be suspected.

Many poisons can be rapidly excreted from the body. In these cases, only very low levels of poison might be detected. Some poisons can be detected for many years, after death. The embalming process and decomposition can severely hamper the toxicologist's ability to determine a poisonous substance.

Chapter 8

DEATHS DUE TO FIRE

DEATH-RELATED FIRES call for the teamwork approach as much as any type of death investigation. Not only is the police death investigator dependent on such individuals as the pathologist, toxicologist or chemist, but now you must work closely with the fire or arson investigator. The death investigator is concerned with cause and manner of death. The fire investigator is just as concerned about the cause and origin of the fire.

There are a good many reasons why fires occur. However, we can divide these reasons for fires into two basic categories. Intentional and accidental fires are fundamental causes of how fires start. Where death is concerned it is imperative for the death investigator to know if the fire was deliberately set or if it was a simple accident. Arson fires can be a big profit for some. Homeowners, car owners, or business owners can attain financial gain, reduce debt or relocate elsewhere. Persons that have other disorders might set fires for other personal or sexual gratification. However, when life is lost due to fires that are set on purpose, the fire can be classified as a homicide. This type of fire might also be used to produce suicide.

The Fire Starter

Malicious

The malicious fire setter most likely suffers from some type of delusion or disorder. These fires are normally directed towards a school, the boss's car, a neighbor's garage or property belonging to a past love relationship.

Unjustifiable

The unjustifiable fire starter will start fires for no reason. This person is most likely a criminal enhancing his chosen career. This type of individual will most likely set fire to a structure after committing a burglary or other theft. Fires may also be started simply to destroy without reason.

Compulsive

A compulsive fire starter will do so after becoming enraged, frustrated or angered due to resentment or jealousy. It would not be unusual for this person to be remorseful after the fact, yet will make every attempt to avoid detection or claim it was an accident.

Impulsive

The impulsive fire starter has a desire to set fires to beautify the neighborhood, or to destroy eye sores or debris. A compulsion justified by the individual that he or she is doing a good deed or even performing a public service.

Hero

The hero is another type of individual to deliberately set fires. This person cannot attain any other form of recognition or fulfillment. He or she will set the fire, make the discovery, and report the fire to the fire department, and even attempt daring rescues. This person hopes to receive recognition or awards.

Intentional

The intentional fire starter could be described as one who uses a fire for sexual gratification. This form of fire is known as pyromania. The fire and the related excitement stimulates the fire starter into sexual fulfillment.

Accidental

The other category for causes of fire is that of accidental. This too can be separated into two subcategories as far as death investigation. One aspect of accidental fire could be due to faulty equipment or electrical wiring, smoking while intoxicated or falling asleep. The unintentional and innocent burning of leaves, trash or other items such as construction debris can spread to adjacent property. These types of fires will usually only affect vehicles, houses or other buildings, and dependent on the response of the fire department, damage may be limited.

Children are responsible for a great number of accidental fires. These accidental fires started by juveniles may be as a result of carelessness, playing with matches, other flame sources, smoking, or playing with combustible liquids. Children that become fatality victims of fire may be found in closets or even on top of refrigerators. Do not be surprised by the location of the children that are found by fire fighters.

The death investigator must realize that death can result in these types of fire. Death is not dependent on who started the fire or why it was started. The victim of the fire is still obviously and irrevocably dead. Statistics of fire victims are taking a turn for the better as for rate of survival. With the increase of burn units and their ability to better treat fire victims, more people are being saved. This increase in lives saved in many ways is amazing. Just a few years ago a person with burns over 80 percent of their body, would certainly give way to death.

There are several reasons why people die in fire. The victim can be burned by the fire, flames coming in contact with the body resulting in burning of tissues. The victim dies of smoke inhalation that may or may not contain various toxic gases, or by inhalation of carbon monoxide. Death may result from various traumatic injuries due to structural damage of the building by the fire, blast injuries of the body due to explosions, and injuries due to falls. Others may jump to their death trying to escape the flames.

Other injuries that are related to the fire possibly postmortem, are alterations produced by fire-fighting equipment, such as the effects of an ax or high-pressure hose. Other injuries of this nature could be produced by earth moving equipment or bulldozers during fire excavation. The heat can cause the brain to boil and the skull can fracture, giving an appearance of blunt trauma. In other rare instances death or

injury may be caused by the fire causing the discharge of explosives or ammunition.

Certainly one of the most important aspects of the death investigator's task is to determine if life was present prior to the fire. In some instances of murder a fire is started to cover up the crime by destroying evidence. The finding of soot in the nose or airway would be an indication that life was present during the fire. Carbon monoxide in the blood is another indicator of life. The pathology of the burned body will determine precisely if the body was burned before death or after death.

The fire investigator upon completion of the fire investigations will be able to provide pertinent information about the fire. Was the fire a sooty fire? Was the fire extremely hot? This is important information that should be related to the pathologist by the police death investigator.

There are some other factors that could have an influence on fire-related deaths. The very young and the elderly are most affected by the fire. The influence of drugs or alcohol may also be a contributing factor as to why death occurred. Other aspects that may also be taken under consideration are whether disease or injury caused the death. Or was there some evidence that indicated the victim was unable to flee? An obvious example of this would be if the victim was in a wheelchair.

A primary concern in your investigation is to determine who is the burned victim? Identification can be extremely difficult. The fire victim can experience a shortening of the body by several inches caused by the heat drawing up the extremities giving the appearance of the fetal position from heat flexion. The victim can also undergo a weight loss of 60 percent due to loss of the body's water. The soot from the fire can change the appearance greatly and is extremely difficult to remove. Hair loss and change of color will also exceedingly change appearance. Gray hair can turn a brassy color, while brown hair can change to red.



Figure 8.1. The victim died as a result of a house fire. The deceased gave an appearance of being a young black male in his twenties. The victim was actually a caucasian male, in his late seventies.

DEGREES OF BURNING

First Degree:

Superficial, outer layer only with blisters. Peeling may occur especially as body is handled, suggesting ruptured blisters. If victim survives, no scarring will result.

Second Degree:

Adds blistering. If victim survives, usually may heal without scarring. Similar to decomposition blisters.

Third Degree:

Damage to full skin thickness. Areas may be painless because nerve endings are damaged. Healing is from edges. Usually skin must be grafted.

Fourth Degree:

Most severe. Charring, loss of skin, subcutaneous tissue or even body parts. Usually suggests postmortem burning in addition to burning during life. Blood can become a red hard brick material.

Estimation of Body Surface

Nine percent of surface each front and each lower extremity, back of each lower extremity (total 36%), front and back of each upper extremity (18%), anterior trunk (18%), posterior (18%), face and neck (4 1/2%), scalp (4/12%). Without special burn treatment those over 50% total second degree (burn) or worse are usually fatal. Today there are some fire victims saved at 80% burned. Severity of burns depends upon the time of exposure and intensity of fire.

The police death investigator should be aware of other facts during this type of investigation. Always leave any clothing, jewelry or any other personal items found on the body exactly where it was found. This may help identify the victim.

HEAT INJURY

Aspects

1. Who is the victim?
2. Was the victim alive or dead at the time of the fire?
3. What was the actual cause of the victim's death and was the cause directly related or indirectly related to the fire?
4. Are there any natural diseases or injuries unrelated to the fire which could have caused death or could have been a contributing factor?

5. Was the victim under the influence of drugs or alcohol?
6. What is the manner of death (accident, suicide, homicide)?
7. If the victim was dead at the time of the fire, is there any evidence that the fire may have been a method to destroy or mutilate a homicide victim in order to conceal identity or the true cause and manner of death?
8. Is it possible that the fire was used to destroy or disfigure a dead body in order to perpetrate an insurance fraud?
9. Is there evidence that the decedent was a victim of suicide by other means, having attempted to hide the cause and manner of death by setting fire to the surroundings?
10. Is there evidence of arson with the victim or victims perishing as an unintentional and unforeseen result of a feloniously started blaze? These questions need to be answered when investigating the aspects of heat injury.

Causes of Injury and Death

1. Flame contact.
2. Severe heating of the body without actual flame contact.
3. Inhalation of carbon monoxide.
4. Inhalation of toxic gases, particularly from burning plastic items.
5. Traumatic injuries due to structural damage of buildings, blast injuries, injuries sustained in escape attempts, injuries due to high pressure hoses, and postmortem injuries due to clearing of the area.

Postmortem Appearance of the Burned Body

1. First, second, and third degree burns with:
 - a. Reddened, blistered skin.
 - b. Detachment of skin from the hands and feet.
 - c. Clothes and firm position against a surface may lessen the heat effects allowing identification of skin color and other skin features.
 - d. Gentle rubbing of a burned skin surface may disclose tattooing.
2. Severe burning of body—fourth degree burns.
 - a. Usually occurs postmortem.

- b. Clothes and hair burning. In an area where oxygen is excluded, shreds of clothing may still be present.
 - c. Charring of all or part of the body with severe disfigurement, skin splits often with rupture of the stomach wall with protrusion of the intestines, reduced height and weight, burn amputations, contraction of muscles with so-called pugilistic attitude, and usually with well-preserved internal organs.
3. Complete consumption of the body is unusual in most house fires. Chemical fires may cause virtually complete consumption. Small children may be largely consumed.

Chapter 9

DROWNING

DROWNING IS OFTEN CONSIDERED a form of asphyxia. However, actual drowning is very much more involved than lack of air. True asphyxia is said to occur in approximately one in ten drownings. The medical opinions attest that drowning results from closure of the larynx or windpipe. The airway is sealed off and prevents inhalation of water into deeper air passages. Closure of the airway is not detectable at an autopsy due to relaxation of tissues during post-mortem.

Submersion creates a hysteria and the victim struggles to keep their head above the water's surface. The victim attempts to hold their breath until carbon dioxide accumulates in the blood, and reaches a level whereby the victim gasps for breath, inhaling water. Struggling leads to exhaustion. Swallowing water, coughing, vomiting and gradual loss of consciousness proceeds in rapid sequence. The escape of air and the replacement of water continues. Unconsciousness and convulsions associated with gasping precede breathing failure. Irreversible changes in the brain can take place, followed by death in a very short time.

The implication of drowning is usually accidental. Obviously homicide and suicide should always be considered. Duration of submersion is synonymous with establishing the time of death. Many changes in the body depend on the water temperature. Estimation of submersion usually cannot be estimated if duration is greater than one month. The body will sink unless air is trapped in clothing. Due to the weight of the body it will sink quite rapidly. The victim will surface during the decomposition stage. Rigor mortis in drowning has a variable onset due to activity prior to death and water temperature. Livor mortis will be noted in the lower extremities, the face, upper chest, hands, lower

arms, feet and calves. The lividity in these areas of the body will be found in an unrestrained body. This will almost always cause the body to float face down, resembling the fetal position. Decomposition also depends on the water temperature and bacteria in the water. Bodies will normally float to the surface in seven to 14 days. Once the body is removed from the water the rate of decomposition is quickened. Remember bodies decompose faster in the air than they do in the water. Adipocere will be more rapid in warmer water.

Some in the medical field believe that a victim can drown in three to five minutes in fresh water, but can take slightly longer in seawater due to salt in the water. Findings are generally similar in both fresh and seawater. However the salt in salt water retards the bacteria and therefore decomposition is slower. Expect to find foam in the nose, or mouth, and water in the lungs and stomach; however, on occasion, none of these items may be found. Findings of foreign material in the mouth, airways, lungs and stomach could be vomit, water plants, or mud. Collapsed lungs filled with water may also be noted.

The circumstances surrounding death is important in establishing the cause of death and for establishing the manner of death. The victim may look the same in a variety of cases no matter how the victim entered the water. The victim could jump, fall, or be pushed and the death investigator will still have the same postmortem findings. Sudden drowning of an accomplished swimmer is not an uncommon event. The swimmer taking deep breaths before a long race can hyperventilate. Once in the water the swimmer can actually pass out or develop unconsciousness and drown. Diving into cold water can also lead to hyperventilation with the same tragic results. Obviously, other deaths can be attributed to diving. Upon entering the pool headfirst the neck or head can be injured, causing a low level of consciousness, allowing inhalation of water.

Other diving-related deaths would be those associated with skin diving or scuba diving. Many of these deaths have contributing factors of equipment failure. Polluted air tanks or lack of air stored in the tanks can be a cause. Inadequate breathing while submerged or air embolism may also be a reason for drowning deaths in the underwater domain. Associated with underwater swimming activities is a health problem termed sudden compression. Sudden compression occurs when underwater divers rise from extended swimming in deep water. Gas bubbles can form in the body from dissolved gases. The

formation of gas bubbles can normally be avoided by a slow ascent to the surface of the water. Divers suffering from sudden compression can be successfully treated with expeditious medical treatment. This treatment requires an intake of oxygen and placing the diver into a high pressure chamber.

Most victims that are found in bathtubs either died from a disease, or drowned due to a disease-related unconsciousness. Another incident that the police death investigator needs to investigate is associated with drug overdose. Victims may be found partially or completely submerged in the bathtub after an adverse reaction to a drug overdose. Another instance of drowning, can be associated to cold water drowning. Long duration of immersion in cold water can be extremely fatal, more so than most swimmers understand. The cold water so drastically decreases the metabolic rate that a state of suspended animation develops. The vital functions of the body are slowed and stopped due to the cold water. During this time the body can go longer without oxygen. Frequently, persons are revived after removal from icy waters even though immersion has been longer than the normal three to five minute expectation of drowning taking place. The same length of time under the water, when the water is warmer proves fatal, while cold water drowning does not always result in death. Serious consideration of resuscitation attempts must be made if victims are recovered from cold or icy waters.

HYPOTHERMIA

Exposure of parts of the body such as the nose, ears, fingers and toes may become frozen with the disruption of tissue integrity by ice crystal formation and salt concentration during the freezing process. This can cause extensive circulatory changes and local hypoxia results. Whole body exposure to intense hypothermia may result in fatal circulatory collapse without evidence of freezing any part or, in fact, without the temperatures being below freezing.

It is not uncommon to find children or younger adults who have been found in water or exposed to bitter cold elements that show no vital signs of life. Time of death could be moments to several minutes. Miraculously as it seems, some of these victims have been revived

with little or no apparent damage or injury. Other victims have been resuscitated and found to have a small neurological complication. All police and medical responders should understand events related to hypothermia. People's lives can, in some situations, be saved.

The police death investigator must think about postmortem artifacts, injuries that occur after death. Those artifacts are damage done by fish feeding from the body or by propellers of boats. Drowning needs as much investigation as possible. All information developed should be discussed with the pathologist to aid in determining the rightful cause of death.

Case History 1

Two brothers and a friend found an older gentleman while they were out drinking. They thought the old guy had some money. They drove out to the river bridge and there they tied up the old gent with his own shirt that they had cut into strips. The three then robbed the old man of \$2.30. The three men pushed the old fellow into the river after tying his hands behind his back. It was in the spring of the year and the river was about 14 feet above flood level. The victim was discovered approximately 40 days later. Homicide by drowning is unusual. Thinking that we may not ever find the victim, one suspect was actually charged before the finding of the body. At the autopsy we discovered \$60.00 that the victim had hidden in his sock.



Figure 9.1. Cause of death was due to drowning. Manner of death was due to homicide. The victim's hands had been tied after being robbed. The man was then thrown into the river.

Chapter 10

GUNSHOT WOUNDS

BECAUSE OF THE HIGH NUMBER of deaths, homicides, suicides and accidents associated with gunshot wounds, it is imperative that the police death investigator be well-versed in gunshot wounds. Gunshot wounds occur because of kinetic energy. A projectile needs approximately 200 ft. lb. kinetic energy. This energy is determined by weight and velocity: $K.E. = WV^2 / 2g$. W is the weight, and V is the velocity, and g represents gravitational acceleration. Velocity is of the greater significance to the formula. K.E. will vary because of type of powder, muzzle fit, barrel length, weight of bullet and caliber.

The bullet, when fired, enters the body causing damage to the outer skin and the tissues it passes through. In smaller caliber weapons the damage is found along the bullet path. In high-powered weapons the damage can be found away from the bullet path. This is due to the body being impacted with this higher velocity. The force of this pressure can produce injuries to organs some distance from the point of entry.

Bullets have a tendency to spiral and tumble producing a larger bullet hole than the size of the bullet. Because of contractions and pulsations this wound will appear to be smaller in seconds after entry. The wound track will still indicate the path that the bullet traveled. It is important to be aware that the bullet does not always travel in a straight line while in the body. A bullet can enter at the top or bottom of the body and actually exit at the opposite end while causing damage throughout the body.

Five Types of Gunshot Wounds

1. Entrance
2. Exit
3. Gutter
4. Re-entry
5. Ricochet

Handgun Ranges

1. Contact
 - a. Tight Contact
 - b. Loose Contact
2. Close
3. Intermediate
4. Distant

Range Characteristics

CONTACT:	Tight or Loose	Soot in the wound
CLOSE:	12" to 18"	Stippling
INTERMEDIATE:	18" to 36 "	Loose deposit of soot
DISTANT:	36" or more	Lack of soot

Some gunpowders will fly farther and burn faster due to variables such as ball, flake or disc, and the fact that some are cleaner than others. Therefore, range characteristics could be slightly different. Tests with the same weapon and gunpowder should be done whenever possible. Soot or smoke is from gunpowder and can be found, in and around the wound. Tight contact will have soot in the wound. Loose contact will have this soot around the wound. Stippling or tattooing is defined as unburned powder particles. In close range these unburned powder particles can be embedded in the skin around the wound. In distant range lack of soot and stippling should be observed.

Contact wounds are most associated with self-inflicted gunshot wounds, specifically suicide. However, the police death investigator must examine all aspects of the shooting. Gunshot wounds to the head have a blast effect due to gases between the skin and the bone. This

causes a stellate or star-shaped wound due to tears in the skin. Soot may not be found on the skin, but will be found in the wound itself. In this type of contact wound, where gases blow the skin outwards from very high velocity, entrance wounds may appear like an exit wound. The exit wound will resemble an entrance wound. This irregular entrance is not the typical damage for an entrance.



Figure 10.1. (Atypical) Entrance wound associated with contact range. Caused by a build up of gases from a high velocity handgun. Without careful examination this might be considered a typical exit wound.



Figure 10.2. (Atypical) Exit wound (see Fig. 10.1). Without careful examination this type of wound could be determined to be a typical entrance wound.

For years we were able to perform a paraffin test on the hands to see if a person fired a gun. Later came the NAA test, Neutron Activation Analysis using 5% nitric acid swabbed on the hands checking for gunpowder residue. These swabs were then analyzed by a flameless atomic absorption spectrophotometry for the presence of lead, barium and antimony from the cartridge primer. Most agencies stopped using these techniques because laboratories were reporting findings on a person's hand of gunpowder from a gun that was shot from across a room. Other tests support that in a room 10 feet by 10 feet it is possible that anyone in the room could conceivably have a positive reaction to having fired a gun.

Shotgun Ranges

- | | |
|------------------|----------------|
| 1. Cookie cutter | 0" to 2'-3' |
| 2. Rat hole | 3' to 10'-12' |
| 3. Satellite | 12' and beyond |

Shotgun barrels have been classified by gauge which is used to describe the caliber of the shotgun. This refers to the choke of the barrel which limits constriction of the bore of the shotgun barrel at the muzzle opening to control shot patterns. Moreover, different chokes produce different shot patterns.

Obviously because of the blast of shot from the shotgun, massive damage from gunshot wounds can be viewed. The pathologist should make every attempt to remove, not only all shot, but also the shot cup and wadding. A unique injury that has been observed from a shotgun wound is the imperfection in the skin that resembles the iron cross. This deformity is seen when the shot cup opens up, striking the body.

A familiar attitude at a death scene is for the emergency personnel to cover the victim with a blanket or sheet. Although a kind gesture, covering a body can be very costly as far as loss of evidence. An excellent example of this loss can be documented in a homicide where the victim was shot once in the eye and then fell to the ground. The victim was then shot in the back four times. The victim was wearing a white overcoat and traces of grease from the bullets could readily be observed. The person responsible for the shooting had kept the bullets in a greasy bag. This bag of greasy bullets was recovered, the weapon was not. By the time the victim was transported to the morgue a blanket had been placed on and taken off the victim numerous times. At the autopsy no grease could be recovered.

Another key element that the death investigator should be aware of is body momentum. Unlike action movies, bodies do not fly across the room when struck by a bullet. The impact of the bullet will not knock you over. The body absorbs the energy of the bullet. The body faces the direction of the momentum.

Classical Gunshot Sites in Suicide

Heart	Temple	Mouth	Forehead
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Objectives of the Death Investigator

1. What was the cause of death?
 2. How many times was the victim was shot?
 3. Determine if wounds are entry or exit.
 4. Determination of range of fire.
 5. Determination of direction of fire.
 6. Evidence recovery.
 7. Determination of manner of death, homicide, suicide or accident.
- The police death investigator must work very closely with the pathologist at all times.

Unique Findings

Examination of the hands of a shooting victim revealed a strange “L” pattern in soot on the palm of her left hand. The same pattern was found on the back of her right hand. The victim’s husband gave a statement that the victim shot herself and the soot on her hands was from having fired the weapon. After careful examination and test firing using graph paper, we were able to reproduce this same “L” pattern. We determined the “L” in soot was created while the victim was attempting to place her hands on the weapon at the time of being shot. The left palm turned in and the right palm turned out had been pressed up against the gun and the cylinder. Like the muzzle flash there was a flash of soot between the cylinder and the barrel of the revolver, creating the “L” shape pattern.

Cylinder Flare

Soot residue that escapes through the gap that exists between the front of the cylinder and the back end of the barrel of revolvers can be seen adjacent to close range and contact entry wounds. The scene investigation, in gunshot cases, should include collection of the weapon, if possible. The weapon, if located, should be made safe using extreme caution not to disturb, contaminate or obliterate any evidence that is present. **Do not allow a loaded or unsafe weapon to be sent to the pathologist or the crime laboratory.** The missiles that exited the body or that were misses should be recovered. Collect all empty spent casings, shot wads or shot cups. Gather any additional



Figure 10.3. Cylinder flare. The victims hands displayed an unusual "L" shaped pattern. This pattern was created by the hands being placed against the cylinder and the barrel of a revolver when fired. This flare originates at that point where the barrel and cylinder meet. (Not the same as muzzle flare.)

live ammo that can be located at the scene. Evidence collection should also include gun-cleaning kits. In all rifle and shotgun cases that might be classified as suicide, be sure to measure the victim's arm and the trigger to muzzle distance.

Chapter 11

CUTTING, STABBING AND BLUNT TRAUMA

CUTTING AND STABBING

THESE TYPES OF WOUNDS are caused by a sharp object that is forced inwards of the body. There are three types of these wounds that the police death investigator should be familiar with. They are incised, stab and chop. The competence to examine and correctly identify the correct type of wound is of great importance in your death investigation. The medical examiner or the pathologist can assist you with these matters of legal importance. Other factors that must be resolved are the number of wounds, the depth of penetration, type of weapon, wound tract and wound angle.

INCISED

Wounds or cuts that are due to contact with a sharp object having been drawn over the skin with enough pressure to produce an injury. These wounds can be various shapes due to the various type of objects used. It is usually difficult to tell much about the instrument that caused the wound. Incised wounds do not penetrate deeply into the body, but merely extend along the skin's surface. Typically self-inflicted injuries are caused by these types of cuts. The term hesitation marks should be considered in all incised wounds; however, this does not exclude homicide. These types of injuries can be caused by cutting or by blunt impact. Blunt force will produce a tear or laceration of the skin. Good scene examination can assist the death investigator in determining the events that occurred.

Description

1. Is a cutting wound
2. Usually elongated
3. Usually gaping

PUNCTURE

Wounds that are stab or puncture wounds are due to fairly long and sharp instruments penetrating into the body. It can create danger to the internal organs although the outer skin may not show much of an injury. What appears as a minor wound, to the skin surface, can cause severe internal bleeding and death. Rarely will a stab wound create a bruise. It is more likely that the person holding the knife impacted the body during the stabbing. Stab wounds are more associated with homicide rather than suicide. However, the police death investigator must always consider that deep penetrating wounds can be self-inflicted, unbelievable as it may seem, as some stab wounds are so severe.

Description

1. Is a stab wound
2. Usually penetrating
3. Usually oval

CHOP

Chop wounds are deep and gaping wounds, occasionally involving major structures. These wounds result from heavy and sharp instruments.

Description

1. Caused by a large or heavy object
2. Gaping wound
3. May go as deep as the bone structure

DEFENSE WOUNDS

Occasionally defensive wounds can be observed on a victim. These wounds will be on the hands, arms, feet, legs or perhaps even the shoulders. These wounds are obviously created by the victim attempting to defend himself or herself from the attacker. These defense wounds can be from cutting, stabbing, chopping or from blunt impact. In fights or struggles both the victim and the assailant can have similar wounds. The assailant may attempt to use this in court for his or her defense. Defense wounds are also of value because they indicate that the victim was, at some point, conscious and attempting to resist. Careful examination and study of these types of wounds must be completed along with a comprehensive crime scene investigation.

Case History 1

On the Fourth of July 1976, I became involved in a murder that would take three years to investigate. Fortunately for us we had removed a piece of paneling with a bloody palm print. Three years later the FBI laboratory was able to develop the bloody palm print and make a positive identification to our suspect. The positive print match was of a suspect we had developed in 1976, but could not get enough evidence to file charges. We were aware that he had severely sliced his hand at some time period during the murder. We matched his blood type with blood that we collected at the crime scene. The lab reported the suspect blood type was one in one hundred thousand. However, it was not until we got the print match, that we could make the arrest. To little avail the suspect argued at trial that he was forced to kill the victim because the victim had attacked him with a knife. The scene investigation indicated a fight or struggle, but also showed that a robbery had occurred. The crime scene investigation supported our murder case and not self-defense.

BLUNT TRAUMA

It is sometimes difficult to distinguish between sharp object injury and blunt trauma injury. Both types of injury can produce some similar characteristics. However, a sharp instrument will cut into the tissues. Blunt trauma injury will produce tears or lacerations. There are four categories of injury produced by blunt force; they are bruise or contusions, abrasions, lacerations and bone fractures.

BRUISES/CONTUSIONS

Bruise or contusions are caused by leakage of blood into the skin or tissues or both. Typically the skin is not torn in a bruise or contusion. Bruises can appear quite rapidly and can appear in a pattern. Identification of this pattern will undoubtedly assist the police death investigator in determining the cause or the circumstance of the injury. A fresh bruise will appear reddish or reddish blue in color. The bruise will change in color with age from the reddish color to purple, to green, yellow and into brown. At this point the bruise will start to fade.

Aging of bruises has received mixed comments from the medical community. There are several reasons for the various time schedule of bruising. Infants, elderly or say someone that is diabetic will bruise easier, faster and stay longer than perhaps in a healthy middle-aged man or woman. As with most factors we do have some guidelines that can be followed. The reddish blue color can appear within a few hours of the injury. The purple color can be observed within a week, and the green, yellow and brown color follow very quickly. Total disappearance of the bruise is thought to be within two to four weeks. The bruise examined microscopically will produce a more accurate aging. This can be reported by the pathologist or medical examiner.

Stages

1st Stage	Light Bluish Red	slight swelling noticed in a few hours
2nd Stage	Dark Purple	occurs within a week
3rd Stage	Green	
4th Stage	Yellow	
5th Stage	Brown	lasts about 2-4 weeks

Keep in mind that not all blunt force trauma results in bruising. Bruises may not be observed for several days. Bruising may actually be seen away from the exact point the trauma occurred. Bruising may not be observed in an area where blood has escaped from vessels, such as in lividity. Lastly, remember that the bruise is often larger than the trauma that caused the bruise.

ABRASIONS

Abrasions are due to scraping of the skin and are rarely life-threatening. A pathologist or medical examiner, by incising the abrasion, can determine if the victim was alive when the abrasion was made. This is especially true in cases where the victim might have been restrained or tied up. Hemorrhages that are found in various tissues around the abrasion may be an indication that life was present when the injuries occurred. Unlike bruises that might be found away from the exact point of trauma, abrasions attest to the exact point of blunt force impact.

An abrasion will produce fluid from the tissues or even blood for a day or two. The abrasion will start to heal and become a scab and eventually disappear. There is no absolute rules in aging an abrasion. This healing will be dependent on many variables such as the extent of injury and location. After death the abrasion will dry and could give an appearance of a bruise.

Another unique characteristic of the abrasion is that it can often show the pattern of the object that produced it. Obviously, this pattern can be helpful in determining the attributes of the force that caused the abrasion. This pattern may be located on the skin or even found on the clothing. This pattern may help determine the exact weapon used.

LACERATION

A laceration is tearing from blunt trauma. It should not be interchanged with any other similar injury caused any other way than blunt trauma. Lacerations can have abrasions and bruising surrounding them. The shape of the laceration may indicate the shape of the object that produced the injury.

Lacerations can be caused by being struck and by falling onto a hard surface. The police death investigator must know and understand this. Injuries can be observed that would indicate that the victim was struck, resulting in a laceration. The example that comes to mind, having seen so many instances, is that of an older person who has a heart attack while in the bathroom. The victim falls striking his or her head on the smooth flat surface of the marble top sink.

Occasionally, a laceration can hold additional evidence. Debris or foreign matter from the object that created the injury can reveal how the injury occurred. It is important to note that superficial lacerations may not appear to be significant enough to cause death; however, the victim can be found dead with only this minor injury. External examination may not reveal the severity of the internal damage to the organs, or massive internal bleeding caused by blunt trauma leaving only a small laceration.

BONE FRACTURES

The significance of this information is that sometimes misinterpretations on descriptions of wounds are made in this area. Blunt trauma force can produce an injury of a bone fracture. Different types of injuries will cause different types of fractures. A noted area of interest that relates to injury would be bone fractures that occur from being struck by a vehicle. During investigation questions frequently arise. What type of vehicle was it? How big was the vehicle? Which way was the vehicle traveling? Consideration must also be given to fractures that were produced after death. I have actually witnessed ambulance attendants that caused postmortem fractures when attempting to break rigor mortis to start an IV. They actually fractured a bone in the victim's arm. Rib bones can also be fractured during CPR attempts. As mentioned numerous times before, scene investigation and documentation is crucial. This type of information must be provided by the death investigator to the pathologist or medical examiner. Without this information findings can be inconclusive.

Injuries produced by blunt trauma will be dependent upon how they were caused and what caused it, either by the impact or by the object. There are certain factors that the death investigator must establish. In relationship to the death, when did the injury occur? How the injury occurred, what caused the injury, and what amount of force was needed to produce a particular injury, are all questions that are legally relevant to the investigation.

Remember that an examination of wounds may provide the nature of the instrument, the amount of force used, or the direction of the force. The examination may detect foreign bodies in the wound that are useful in the identification of circumstances.

Chapter 12

ELECTRICAL AND LIGHTNING DEATHS

ELECTRICAL

WHEN AN ELECTRICAL CURRENT passes through a human body, a wide variety of effects can be produced and observed. Injury from electrocution can be as insignificant as a muscle spasm up to and including death. Strangely, death can result from electricity passing through the body without showing any signs of burns. Yet, just the opposite can also be observed. An individual may be severely burned from having come in contact with electricity and death may not result.

Death is caused by a high voltage of electricity passing throughout the body and affecting the heart or brain. Additionally, large amounts of heat that is produced by the body may also be a contributing factor to the onset of death. Of great significance is that portion of the body that the current passes through. For example, should the current pass through the heart, the failure of the heart results in death. Should the current pass through a limb like the leg, then only the leg will be severely damaged. As mentioned, the body may produce large amounts of heat. This build-up of heat can be a cause of death or produce other injuries. That portion of the body that comes into direct contact with the electrical current may have burns where the current actually entered the body. Additionally, the body can be burned where the current exits the body.

In lower voltage electrocutions death may not occur instantaneously. Normally in this type of electrocution the heart beat is affected by a change in rhythm caused by the electrical current. Called auricular fibrillation, low voltage electrocution causes the heart to fail, shutting down the supply of blood to the brain, resulting in unconsciousness. Life in this circumstance can be saved if recognized quickly enough,

and by administering artificial respiration. During cardiac defibrillation, an electrical current flow used to put the heart in rhythm is enormous; however, it is only operated for a short duration.

The death investigator must also keep in mind that a victim does not necessarily need to come into direct contact with an electrical current to be electrocuted. Many objects that we touch every day can become conductors of electricity. One example of a conductor that we encounter is water. In severe storms where wind and rain are produced, electrical power lines can be knocked down, perhaps even fall in a small puddle of water. Coming in contact with the water can produce electrocution although the victim never touched the power line. How about the faulty light in the swimming pool? A swimmer can be electrocuted by placing a foot in the pool to test the temperature of the water yet never coming into direct contact with the electricity.

Likewise, machinery and construction equipment can become conductors of electricity when a part of the machinery comes in contact with a power line or other source of electricity. Thus, the operator and any one else touching the machinery may be electrocuted.

Electrocution Key Points

1. Causes interruption of the heart or brain.
2. Good opportunity for resuscitation.
3. Body must be part of circuit between power and ground.
4. Body is a conductor of electricity.
5. Occasionally, the better the contact, the lower the burn.
6. Longer contact can produce more damage.
7. Higher voltage is more dangerous.
8. May initially survive and death occur later.
9. May not be able to see any marks of electrocution.

LIGHTNING

Lightning strikes the ground more than eight million times a day. Worldwide, more than one thousand people are killed each year from lightning. Some 300 to 400 people, in the United States are struck by lightning every year. Amazingly most people struck by lightning will survive.

There is no absolute method to avoid being struck by lightning; however, there are some things that a person can do that might help. Stay clear of trees, get away from water, and avoid metal objects like golf clubs. Other items that should be avoided, during an electrical storm are electrical appliances, water lines and other plumbing, and telephone lines. Automobiles may help to avoid lightning strikes to some degree, but this is not a totally effective method. Lightning can and has struck and killed occupants of vehicles.

Unlike electrical deaths, victims of lightning are struck by a current up to twenty million volts for only a brief moment. A lightning strike resembles effects from a high voltage electrocution. Electrical current from lightning passes through the body's internal electrical circuits involving the heart and the brain. This can occur without evidence of injury to the surface of the body, or with only very minor injuries. It is rare to observe severe burning from a lightning strike. A tremendous amount of heat, fifty thousand degrees, can be produced from a body in a lightning strike. Metal objects on victims have actually melted, yet the body showed little or no evidence of any burning. The skin of lightning strike victims may appear blue. Large amounts of blood may be found internally due to hemorrhaging.

One noticeable effect of lightning strike is a fern-like pattern, referred to as LICHTENBERG'S FLOWERS, that can be observed in the upper portions of the body. This can be seen across the upper back and shoulders and in the upper trunk area of the front of the body. Formerly, these plant-like designs seen on the body were thought to be patterns of the nearby plants and trees. Still an unresolved question pertaining to the fern-like patterns is whether this pattern develops at the instant of the strike, or is something that develops postmortem. Generally accepted is the thought that this pattern is caused by the breakdown of red cells within the skin and blood entering the tissues. This fern pattern may be the only indication that a victim was struck by lightning, and therefore, the body must be carefully examined whenever lightning is suspected as the cause of death.

Another important fact for the police death investigator to be aware of is that a person may die from what is thought to be a lightning strike; however, the person was not actually struck by lightning. When lightning strikes the ground, expanded or expelled air can toss the victim for some distance producing injuries sufficient to cause death. Expect to find evidence of the victim's clothing having been torn,

shoes that appear to have been removed. Whether it be from electrocution or lightning strike, it is crucial to check all of the victim's clothing. Electricity upon leaving the body can blow out parts of the body and clothing as well. In some instances, victims of lightning strikes may appear like victims of vehicle pedestrian crashes.

Lightning Key Points

1. Unpredictable
2. Extremely high voltage
3. May hit other objects first, then strike body
4. May disrupt clothing
5. Fern-like patterns
6. Shoulders and feet are where electrical path normally travels

Chapter 13

TRAFFIC CRASHES

TRAFFIC CRASHES ARE THE LEADING cause of all accidental deaths and all deaths of persons under 25 years of age. Due to this high number of traffic crash deaths, the increase in caseload can present additional problems for many police agencies. One reason that problems occur in death cases related to traffic crashes is because they may be under litigation for many years before a final disposition is obtained. Additionally, most traffic crashes are left to the uniform, or patrol division to investigate. A police officer on the beat, may do an excellent job investigating vehicle accidents, however, serious problems can arise in those accidents where the crash becomes fatal.

It is of significant value to law enforcement and the community to insure that the traffic crash is properly and completely investigated. The police have a responsibility to the innocent. It has often been said that police officers are gatherers of the facts. In some instances this concept is enough; however, in death cases an investigator with a background in death investigation should be involved in the investigation and reconstruction process of fatality accidents. It is crucial that accidents that result in death are carefully investigated to insure that criminal and civil justice is fulfilled.

On a positive viewpoint, the auto construction industry, for the most part are currently meeting or exceeding vehicle safety standards set by the government. Also, the National Highway Traffic Safety Administration (NHTSA) has set out guidelines for traffic safety. These guidelines include safety standards that relate to doors, doorlocks, energy absorbent steering wheels, dashboards, front and rear bumpers, front seat airbags, side door airbags, and the use of seat belts have all helped to reduce the number of deaths.



Figure 13.1. Traffic crash involving a large tractor trailer. The one-vehicle accident that resulted in the death of the driver of the truck had to be reconstructed to determine exactly what had happened to cause the crash. Note the skid marks on the roadway.

However, even with all of these safety features, traffic crash deaths continue to occur. Some of the safety features can be a contributing factor to injury or death. Seat belts have been a source of injury in instances where the impact force is extremely high; however, being thrown from a vehicle, increases the occupants potential for fatal injury by more than five times. Airbags have also produced severe and fatal injury upon inflation. Deaths of infants placed in a car seat in the front seat have been attributed to the inflation of the front seat airbag.

Traffic crash death investigation is at the top of the types of cases that require, no command teamwork. Only by a concentrated team

effort of the accident investigator, accident reconstruction officer, death investigator, emergency medical personnel, pathologist and coroner, is it possible to establish pertinent and relevant facts of the crash. It is only by the combined efforts of these professionals that a competent investigation can be completed.

Only within the past few years has the accident reconstruction officer (ARO) surfaced as one of the most substantial elements in the investigation of traffic crashes. It is unfortunate that all law enforcement agencies in the country cannot have their own accident reconstruction officer. Realizing this is not possible, it is important to note most larger cities, counties, and state police agencies have a qualified ARO that, upon a request can assist you with your accident investigation. Understanding the contributions that the ARO can add to an investigation, I began including a block of instruction in my death investigation classes about accident reconstruction. I was fortunate to enlist the expertise of Illinois State Trooper Daniel Derenzy to instruct on the subject. Trooper Derenzy, a certified accident reconstruction officer, holds a Bachelor of Science Degree in Nursing and is a member of the Illinois Association of Technical Accident Investigators (IATAI). IATAI certifies sworn law enforcement personnel nationwide as accident reconstruction officers. Their web site can be located at www.iatai.org.

There has been such an interest in this type of instruction, that Trooper Derenzy now teaches an eight-hour block of instruction on accident reconstruction. An ARO can add a new dimension and wealth of information to a traffic crash investigation. It is imperative to prove what happened, not just report what you think happened. It is of vast importance that the police death investigator seek out those in other areas of law enforcement and the community that have an expertise that can assist you.

ASSIGNMENT

An initial step in the traffic crash death investigation is to establish what category of assignment each victim falls into. There are four of these assignments: (1) driver, (2) passenger, (3) pedestrian, and (4) unknown. All of these assignments can be extremely difficult to deter-

mine. Even at those times when you have survivors, the question of truth will always arise. As difficult as it may be, it is imperative to establish an assignment for each person. There are things that you can do to help establish a victim's location during the traffic crash. Check the positions of the victims in the vehicle (unless the vehicle rolled over). Check the soles of their shoes for brake pedal impressions, clothing, fibers, blood, hair, and fingerprints that might be matched with specific areas of the vehicle. The pattern of injury or trauma may also provide an assignment or location.

WITNESSES

Witnesses can be helpful, however, they can also create big problems. You must always be aware of the single survivor who implicates someone else as the driver. Also of concern is the sober driver who may change positions with an intoxicated driver, especially in vehicle pedestrian accidents. It is not unusual for a witness involved in the traffic crash, to have posttraumatic loss of memory. The ideal witness is the person outside the vehicle who is unrelated to anyone involved in the traffic crash, and who has no interest in the outcome of the accident investigation.

SCENE INVESTIGATION

When considering the use of a certified accident reconstruction officer, nothing that relates to the scene should be moved or removed unless absolutely necessary. The distance that a car battery flew may not seem important to the death investigator, however it can be extremely crucial to the accident reconstruction officer to prove exactly when the chain of events occurred.

If an ARO is not going to be utilized, or cannot get to a scene until a later time, you must preserve, note and collect vital evidence. Scene measurements should be taken. Measure everything that can be measured. The distance of the tire marks, the distance of items or person thrown or ejected from the vehicle, glass fragments, and anything else that can be observed that relates to the accident. Carefully and accu-

rately record these items and measurements. Take photographs of all pertinent items, objects, victims, vehicles, and the overall accident scene. If the traffic crash occurs at night, take pictures at that time and then go back during daylight hours and take additional photographs.

The collection of physical evidence should include glass or glass fragments, bloodstains, personal effects, shoes, clothing fragments, detached vehicle parts and headlamp and taillight bulbs. As in many collection of evidence situations, it is better to collect it now and not need it, than to not collect it and need it later.

In handling the body at the scene it has been stated throughout this handbook to place a white sheet under the victim and place the sheet and the body in a body bag for transportation to the morgue. Any clothes on the body need to be left on the body. Additionally, items of clothing found at the scene should be packaged separately. These items should be taken to the autopsy to match items to a particular victim or other items of clothing. Once your evidence has been collected from the vehicle(s) and from the scene of the traffic crash, you may want to have a vehicle inspected by a competent auto mechanic for mechanical problems that might be a contributing factor to the accident. The mechanic may be able to provide specific information that might relate to the steering or the brakes of a vehicle, or something that may be of significance about the tires.

CAUSES AND FACTORS

There may be one cause of a traffic crash, yet that one cause may have several contributing factors. High speed, reckless driving, or just plain inexperience are other causes that should be considered, along with equipment failure such as brakes, steering, or loss of power. Other factors may be such things as: alcohol, drug intoxication, or heart attack. Environmental conditions such as rain, snow, ice and in some instances carbon monoxide poisoning, could also be a cause of an accident.

It is not uncommon for victims of natural death to actually have a collision with another vehicle or object. Frequently, the victim can pull to the side of the road before an accident occurs. However, if death does occur, little or no damage is done to the car, and the victim does

not show significant signs of severe trauma. The same findings may be indicated in deaths brought on by carbon monoxide poisoning from a faulty exhaust system; little or no damage to the victim or the vehicle is observed. The competent auto mechanic can provide important information about this particular defect.

PEDESTRIANS

All too often the traffic crash investigations involve a pedestrian where the driver of the vehicle drives away. Persons struck by moving vehicles with any force have a low rate of surviving. The old and the very young are obviously more susceptible to severe injury from being struck. In any instance, the mere force of the impact can throw the victim. Lower extremity injuries and head trauma is common. The force of being struck can also result in extreme internal trauma.

Known as the hit-and-run accident, this type of case is quite often difficult to investigate and prove. It is crucial to carefully examine the scene and the victim for any evidence that might be left by the suspect vehicle. Evidence that may have been left could be minute or non-existent. When a suspect vehicle is located, this same careful examination of the vehicle must be performed. Additionally, careful measurements of the vehicle must be taken, including the height from the ground to the bumper of the vehicle. The bumper is commonly where the impact with the pedestrian occurs. It is dependent on the speed and the relationship of the positioning of the pedestrian and the vehicle as to whether the victim is pushed away from the vehicle, thrown up in the air or thrown over the vehicle.

Obviously, if the victim is pushed away from the impact there is only the initial point of contact that may provide evidence on the victim or on the vehicle. If the pedestrian is lifted or thrown upwards at impact, there may be additional damage to the upper surface of the suspect vehicle. Lastly, the vehicle may simply run over the pedestrian, doing only minimal damage to the undercarriage of the vehicle. If a hit-and-run suspect vehicle is to be examined, a complete examination of the vehicle from front to back and top to bottom must be performed.

A question that often arises in traffic crash-related deaths, is whether or not an autopsy should be performed on the victims, and if so, which