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THE ROLE OF FORENSIC MEDICINE IN THE SCENE OF CRIME

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Abstract*. The role of forensic medicine in forensic investigations is to provide evidence on the basis of which suspects can be identified and the suspect's guilt can be proved or refuted.*

Forensic experts must ensure that evidence is treated with the utmost care so that it is not contaminated, damaged or misused. Forensic experts restore the order of events in which the crime was committed, combining evidence, investigation and scientific recommendations. This order of action is used in order to understand the mechanism of the crime, the roles of the persons involved in it and the possible objectives of the commission of the crime and etc. The restoration of the crime helps legal experts and subsequently law enforcement representatives to create and present to the court a logical chain of events.

This article analyzes the role of forensic medicine at the place of death. The article analyzes the actions of a forensic expert after finding a corpse at the scene or recording the injury of a living person. The article presents the actions of a forensic expert on the basis of national legislation and the individual expertise gained, and describes the sequence of questions asked.

Keywords: *forencic medicine, scene of crime.*

Introduction

The place of occurrence in criminalistics is called the place where the crime was committed (murder, theft, robbery, rape, etc.) or where tools, traces, objects of the crime are found (parts of the corpse's body, a weapon with which a person was injured or killed, stolen objects, etc.).

Forensic medicine is a branch of medical science that focuses on the application of medical knowledge in solving legal issues. It is used to provide evidence in the investigation of crimes and to help determine the causes of death in cases of murder, suicide and accidental deaths. The role of forensic medicine in forensic investigations is to provide evidence on the basis of which it is possible to identify suspects and prove or refute the guilt of a suspect (CE, 2023).

Forensic medicine has a long history, reaching back to the beginning of the XIX century. At the beginning of the twentieth century, forensic medicine was used as evidence in the investigation of crimes, for example, in determining the cause of death in the case of murder. Over time, the field of forensic sciences has expanded to include DNA evidence, toxicology, histopathology, digital forensic medicine, forensic anthropology, and forensic psychology (CE, 2023).

This article will focus on discussing the role of a forensic medicine or more precisely, a forensic expert at the scene in the discovery of a corpse or an injured person, based on expert knowledge, in order to identify the suspects either to prove or to refute the guilt of the suspect.

Actions at the scene. The presence of a forensic expert in the examination of the scene of crime

Article 31(1) of the Constitution of the Republic of Lithuania establishes the presumption of innocence: "A person shall be presumed innocent until proven guilty in accordance with the procedure established by law and recognized by a final judgment" (Constitution of the Republic of Lithuania, 2019), which is based on evidence collected during the pre-trial investigation, performing the procedural actions specified in the Code of Criminal Procedure of the Republic of Lithuania (2024). When collecting significant data, when special knowledge is required from science, art, medicine, business or other areas of life, the investigating officers inevitably have to seek help from persons who are competent in these areas, such as specialists or experts.

A specialist who has the necessary knowledge and skills is assigned the task if during the pre-trial investigation it is necessary to conduct an examination of objects, and he is also invited to participate in the actions of the process (for example, the inspection of the scene of the accident) and to receive their conclusions and explanations on issues of his competence (Ažubalytė, Jukra, Zakančkauskienė, 2016).

An expert is a person who has the necessary special knowledge and is included in the list of forensic experts of the Republic of Lithuania, to whom the pre-trial investigation judge or the court appoints to conduct an examination in accordance with the procedure established by law. Data obtained as evidence in accordance with Article 20(2) of the Code of Criminal Procedure of the Republic of Lithuania (Code of Criminal Procedure of the Republic of Lithuania, 2024) are to be considered as evidence only if they are recognized as such by the court or judge in whose possession the case is located. Any evidentiary material (including the act of examination and the opinion of a specialist) only at this stage acquires the status of evidence in a criminal case (Ažubalytė, Jukra, Zakančkauskienė, 2016).

An inspection of the scene of an accident is usually an immediate act of the pre-trial investigation, which is carried out at the initial stage of the investigation of the crime. The organizer, manager and direct executor of the conduct of the inspection of the scene of the incident is the investigator, but he is actively assisted by specialists, criminal intelligence officers, police officers. A forensic expert is invited to the scene of the incident, if a corpse or other injuries is found (in his absence, a doctor of any specialty can be invited) (Ažubalytė, Jukra, Zakančkauskienė, 2016).

At the scene, forensic medicine is used to provide accurate evidence in a timely manner during the investigation of crimes (Figure 1.). Forensic medicine can help identify suspects, prove or disprove the guilt of a suspect, and determine the cause of death in cases of murder, suicide, and accident.

Figure 1. Evidence collected from a scene of crime

Source: Wilke, 2022. https://cen.acs.org/analytical-chemistry/forensic-science/Mining-proteins-crime-scene-clues/100/i1

Forensic medicine can also be used as evidence in cases such as medical errors and personal injury cases.

The benefits of using a forensic expert at the scene to investigate crimes are the accuracy of the evidence, the timely resolution of cases and economy. However, in some cases, the use of forensic medicine is also accompanied by certain difficulties, such as a lack of resources, an inaccurate interpretation of the evidence and unreliable witnesses.

The role of the forensic expert at the scene, first of all, it is the transfer of knowledge to the officers. The beginning of the actions of a forensic expert is recorded from the moment the official applies for an investigation of the object by asking questions (e.g., whether it is possible to confirm the fact, time, etc.) of the hit or death.

The forensic expert is obliged to appear in court and give an impartial opinion on the issues submitted to him. An expert who fails to appear in court without good reason or refuses to perform his duties without a legitimate basis may be subject to the procedural coercive measures provided for in Article 163 of the Code of Criminal Procedure of the Republic of Lithuania. The expert is liable for making a false conclusion in accordance with Article 235 of the Code of Criminal Procedure of the Republic of Lithuania.

A forensic expert is also asked to carry out forensic examinations within the scope of his or her competence. Forensic experts have the right to refuse to solve issues that are not within his or her competence and to perform tasks that do not require special knowledge. A forensic expert is also askesd to guarantee a thorough and impartial examination of all the data submitted, to protect the objects submitted for examination, the loss of which is responsible in the manner prescribed by law, to protect state, service, commercial and professional secrets, and not to publish examination data without the permission of the authority that appointed it (Ministry of Health, 2023).

The content of the forensic examination act must meet the following requirements:

1) after conducting the necessary examinations, the expert draws up an examination report. It consists of the introductory part, the exploratory part and the conclusions;

2) the introductory part of the examination act indicates: the date and place of the census of the act; an order to appoint an expert witness; material and questions submitted for examination; the expert's personal data – name, surname, education, specialty, qualification, length of service as an expert; the dates of the beginning and end of investigations; persons who participated in the examination;

3) the investigative part of the examination report indicates: the state of the objects of investigation; the results of their examination; the studies carried out, the methods and means used; the results obtained and their evaluation;

4) the conclusions shall formulate answers to the questions asked (Ministry of Health, 2023).

The conclusions of an expert cannot go beyond his special knowledge.

The qualifications of a forensic expert include the study of both living and deceased persons.

During a forensic investigation of a living person, the authorities that form the indictment ask the forensic expert four main questions:

- What injuries have been inflicted?
- Could the injuries have been inflicted at the time specified in the task?
- Could the injuries have been inflicted in the manner/circumstances specified in the assignment?
- What kind of impairment of health does injuries correspond to?

If the officer does not ask – in full , the forensic officer can ask additional questions, which are usually assigned to the group of defenders.

- What injuries have been inflicted?
- When were the injuries inflicted?
- What is the mechanism by which the injury is inflicted?
- What kind of impairment of health does injuries correspond to?

During the forensic examination of the deceased person, the forensic expert answers the following questions:

1. What is the cause of death?
2. When did death occur?
3. Are there any injuries in the corpse? If so, when and in what way are they done, and what kind of impairment of health do they correspond to?
4. Is there alcohol in the corpse's blood? If so, then what degree of drunkenness does this correspond to?

At the scene of death, a forensic expert is called when the fact of the death of a person has already been established.

Clinical death – circulatory (cardiac) *and* respiratory (lung) arrest, though the brain is alive, so the changes in the body are reversible, resuscitation (artificial respiration and heart massage) can be successful, i.e. resuscitation can restore blood circulation and respiration. Clinical death is the first stage of death. During clinical death there is cardiac and pulmonary arrest, loss of consciousness. After cardiac and pulmonary arrest for a certain period of time, the brain (and other organs) do not receive oxygen, the brain cells die, *biological death occurs*, after which the changes are *irreversible, so resuscitation cannot be successful, i.e. resuscitation cannot restore blood circulation and respiration* (Gentry, 2023).

Undeniable signs of death:

1) lividity;
2) rigidity;
3) injury incompatible with the treatment;
4) decay, there are posthumous alterations that claim that a person's death is biological and trying to resuscitate that person does not make sense Gentry, 2023).

At the scene, a forensic expert tries to determine the preliminary cause of death, the time of death, whether the position, location of the corpse has been changed, and answers other questions.

"*When did death happen?"* is the most difficult, the most important and the "most dangerous", because in the event of a violent death, the police are looking for the suspect, taking into account the time of death determined by the forensic expert at the scene, i.e. the suspects are persons who, during the period of death determined by the forensic expert at the scene, may have been with the deceased during the period of death determined by the forensic expert at the scene.

Body temperature, lividity, and postmortem rigidity are the main factors, which help estimate the time of death.

Body temperature: it is believed that after death, the body temperature of a clothed person found in a living remains the same for one hour, and then drops one degree °C every hour. However, this theory was refuted by Hutchins, who noticed that immediately after death, the body temperature does not remain the same as at the time of death, but rises slightly and after a while begins to fall. (Di Maio and Di Maio, 1992). The forensic expert (and the police) are not aware of the body temperature of the deceased found at the scene while he was alive, what his state of health was before his death (for example, with an infectious disease, the body

temperature can reach 41 °C), it is also not known in what environment the death occurred, what was the clothing of the corpse at the time of death, and other circumstances that may affect the change in the temperature of the corpse. Therefore, theories about determining the time of death by the body temperature of the corpse cannot be accurate (Di Maio, 2004), (Spitz, 2020).

Lividity (livor mortis, hypostasis). After death, blood circulation stops, blood due to gravidity accumulates (settles) in the blood vessels in the parts of the body that are closer to the ground. Lividity is usually appears in approximately 0.5-1.5 hours after death. The color of lividity is purple. In pressed areas of the body (e.g. buttocks, shoulder blade areas, etc.), blood vessels are pressed, so there is no corpses in those places, these places are pale.

Stages of corpses:

1) Stage I (up to 12 hours after death) – the blood is only in the blood vessels. When pressed with a finger, the blood in the blood vessels is pushed (pulled) to the sides, the lividity at the point of pressing fully disappear, and reappear in less than 60 seconds. When the position of the corpse is changed in stage I, the corpses disappear in the previous place, appearing in a new place;

2) Stage II (12-24 hours after death) –part of the blood is in the blood vessels, the other part of the blood through the wall of blood vessels has been ejected into the surrounding tissues. At that stage, when pressing the area of lividity with the finger, the blood that is already in the surrounding tissues cannot be pushed to the sides, as a result of which the lividity at the point of pressing becomes partially pale, and when the finger is pulled, the blood usually returns to the blood vessels in more than 1 minute, and lividity reappear in that place. When the position of the corpse is changed in stage II, the lividity remains in their previous place, and lividity appears in the new place;

3) Stage III (more than 24 hours after death) – when all the blood from the blood vessels through the walls of the blood vessels has been ejected into the surrounding tissues. At this stage, there is no blood in the blood vessels, so when pressed with a finger, the blood cannot be pushed to the sides, and the nature of the lividity does not change (the lividity does not disappear, does not fade). After changing the position of the corpse in stage III, the lividity remains in its previous place, does not appear in a new place (Siptz, 1993), (Knight, 2004).

In some cases, the colour of the lividity may not be purple, e.g. in the case of carbon monoxide poisoning (smoldering, CO), the lividity is light red. Lividity helps: determine the time of death, determine the (preliminary) cause of death, determine whether the position of the corpse was changed after death.

Postmortem rigidity (rigos mortis). Immediatly after death the muscles of the body relax, limbs, head and other parts of the dead body fall under the influence of gravity. Postmortem rigidity begins to be felt about 2-3 hours after death. Full rigidity is felt in all muscles approximately 6-9 hours after death. Rigidity begins simultaneously in all muscles, at the same speed, so the stiffness fully covers the smaller (shorter) muscles earlier (faster) than the larger (longer) muscles. For these reasons, stiffness in the smaller face and neck muscles is felt earlier (faster) than stiffness in the larger arms and legs muscles (Adelson, 2022).

Rigidity can be abolished by forced flexion and / or extention of the muscles. Rigidity may disappear by self-onset of decay.

In some cases, when severe physical or emotional exertion is experienced immediately before death, rigidity may occur immediately after death. This is known as „cadaveric spasm“.

Rigidity can help: determine the time of death; determine whether the position, location of the body was changed after death.

Time of death:

- The body is warm and soft – <3 hours;

- The body is warm and stiff – 3-8 hours;
- The body is cold and stiff – 8-36 hours;
- The body is cold and soft – >36 hours.

Most often, the forensic specialist answers the investigator's questions orally, and later he can draw up his conclusions in the protocol of the examination of the scene. The conclusions made after examining the corpse at the scene are only preliminary and cannot be considered as final conclusions, detailed conclusions are given only after a forensic medical examination of the corpse.

Two stages of the examination of the corpse at the scene are being investigated: static and dynamic. During the examination of the barrel, the corpse is described without changing its pose, the position of clothing or body parts. At this stage, the pose of the corpse, the position of his clothes and individual parts of the body, as well as their position relative to the objects around them, are recorded. During the dynamic stage, the corpse is moved, turned over, his clothes are unfastened: a description of superficial injuries is given.

The corpse can be found in open ground (in the field, in the forest, on the street, on the square) or in a closed room (in a residential building, warehouse, factory). First of all, the position of the corpse in relation to other objects in its environment is determined - the distance of individual parts of the body from those objects is measured, its pose is indicated: horizontal (lying down), vertical (standing), sitting, and so on. If the corpse is lying down, it is indicated whether there is a high-rise, snoring, on the right or left side of the lie. The position of individual parts of the body is described. When describing the position of the head, it is indicated to which side it is tilted - to the right or left, reclined backwards or inclined downwards, its position relative to other parts of the body (for example: the chin is leaning against the chest). First the hands are described, then the legs. If both arms and legs are in the same position, they can be described together (e.g. arms extended along the torso, palms down, legs outstretched, spread out at an angle of 30%). When describing hands, the position of the hands and individual fingers is indicated. In particular, the unnatural position of the body needs to be described precisely (for example, the head is unnaturally backed, the right leg is turned outwards).

The act of examination does not have an advantage over other evidence, therefore it must be assessed on the basis of a full and objective examination of all the circumstances of the case. Thus, the assessment of the act of examination is an analysis of all the material, the nature of the questions asked, the compliance of the conclusion with the task and studies, the necessary tools and methods and their authenticity, the competence and objectivity of the expert.

Conclusions

Forensic medicine plays an important role in the investigation of criminal offenses. With the help of forensic medicine, it is possible to provide accurate evidence in a timely manner, which can be used to identify suspects and prove or refute the guilt of the suspect. With the help of forensic medicine, it is also possible to find out the cause of death in cases of murder, suicide, accidental death, and other cases. Although there are certain difficulties associated with the use of forensic medicine, the benefits of its use in the investigation of crimes outweigh the risks.

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