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# FEATURES OF DAMAGE TO THE LEATHER SUBSTITUTE WHEN FIRED FROM THE "FORT 12R" AND "AE 790G1" PISTOLS FROM DIFFERENT DISTANCES

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**Annotation.** *Examination of damage caused by firearms is always a difficult challenge for a forensic scientist. The reason for this is the unpredictability of the interaction of the trace-receiving surface with the ammunition, additional factors of the shot and residual components of the shot, which in turn is caused by the specific design of different types of firearms and the composition of different types of ammunition, which is also combined with various factors affecting pre-wound ballistics (weather factors, etc.), wound ballistics (different types of human body tissue, different materials of obstacles, their presence, etc.). All these factors require detailed study. The purpose of the study is to compare the features of damage to the leatherette as a complex "clothing + non-biological human body simulator" when shot from different distances using the "Fort 12R" and "AE 790G" pistols. The experimental study was conducted by manufacturing ballistic gelatin blocks, which were covered with leatherette and fired at close range, 25 and 50 cm using "Fort 12R" and "AE 790G1" pistols. The analysis of all fired samples of leatherette revealed the formation of a minus-tissue type defect, with the formation of a round (mostly at close range for both pistols) or oval shape (at 25 and 50 cm for both pistols). Gap formation is characteristic of point-blank shots for both pistols and the Fort 12R at 25 cm. All shot distances and both pistols are characterized by the deposition of residual shot components in the form of half-burnt or unburned powder particles. The dimensions of the defect are approximately the same, but when using Fort 12R, the formation of larger defects was recorded at all shot distances. Thus, during the visual examination, when comparing the samples of leatherette from all the studied distances, significant differences were found between all the studied groups, in particular, between the respective groups of pistols, which makes it possible to identify the pistol already during the visual examination of the sample.*

**Keywords:** *damage to clothes, gunshot injury, gunshot wound damage to the leather substitute, non-lethal weapons, human body imitator, firearms.*

## Introduction

Gunshot trauma is the most significant challenge for many medical fields and remains a complex socio-economic phenomenon that has its own specific prevalence and characteristics in different countries of the world, which is primarily related to the legal status of weapons, but no less importantly, to the economic situation in the country, the presence or absence of social upheaval, political instability, and military conflicts.

Thus, it is important to analyze the results of the analysis of the number of cases of firearm injury before and after the reform of firearms ownership in Australia, namely before - 1979-1996 and after - 1997-2016. In the period before the reform, the average rate of total firearms mortality was 3.6 (95% CI, 3.3-3.9) per 100,000 population, and after the reform, 1.2 (95% CI, 1.0-1.4). At the same time, the authors of the study did not find a statistically significant increase in the number of cases of firearms used to commit suicide [5].

A retrospective analysis of data from 38 mortuaries in South Africa on female homicides in 1999 and 2009 showed that the femicide rate was 12.9 per 100,000 women in 2009, compared to 24.7 in 1999. At the same time, femicides with firearms accounted for 0.54 per 100,000 women [1]. In general, over the 17 years of analysis, more than 105 thousand fatalities from the use of firearms were recorded in South Africa, which averaged 6217 deaths per year. Mortality rates varied from year to year, and in general, the authors of the study identified a period of increasing deaths from 1997 to 2000 and a period of decreasing deaths from 2001 to 2011, with minor exceptions in 2006 and 2008. In general, from 2000 to 2011, there was a 60% decrease in the number of deaths from firearms [11].

Epidemiological studies show a steady increase in the number of deaths caused by firearms in Sweden. If in 2011 and 2012 the number of deaths caused by the use of firearms was 17 people, in 2017 this figure was 41 people. The number of non-fatal cases of firearms use is also steadily increasing - in 2011, this figure was 58 people, and in 2017 it was 135 people. However, this picture is not typical for other Scandinavian countries, such as Denmark, Finland and Norway, where the respective levels either decrease or remain at approximately the same level during the study period [10].

As of 2020, more than 45,000 firearms-related deaths were recorded in the United States. Compared to previous years, there has been a steady increase in this figure - by 14% more than in 2019, and by 25% more than in the past 5 years on average. The further deterioration of the situation, especially after the mass shooting at a school in 2022, allowed the first law to be signed for the first time in 30 years to restrict firearms ownership [7]. In particular, in the United States, there is a pronounced heterogeneity in fatal

firearms use, which varies sharply from state to state. In Bristol County (Rhode Island), the firearms mortality rate is 1.6 per 100 thousand people, while in Kusilvak (Alaska), the rate is 66.1 per 100 thousand people [9]. The rate of suicide by firearms in the United States is also increasing, with an increase from 53 to 55% from 2020 to 2021, which amounted to more than 26 thousand cases [19].

In general, the number of deaths from gunshot wounds is on the rise in the world. An analysis of data from 195 countries revealed about 209 thousand deaths in 1990. Already in 2016, this figure amounted to 251 thousand. Among them, 64% were murders and 27% were suicides. The lowest mortality rate from gunshot trauma (homicides only) was found in Singapore (0 per 100 thousand people) and the highest in El Salvador (38.9 per 100 thousand people) [15].

All of these factors increase the interest of scientists in the study of firearms and all aspects related to them and thus can help in the analysis of cases of their use. And although the most commonly used method is undoubtedly the analysis and study of residual shot components [12, 20], it is equally important to take into account other material evidence. One of them is clothing. It is a proven fact that clothing affects the characteristics of damage to adjacent tissues, including the human body, which was confirmed experimentally using a non-biological human body imitator, gelatin [21].

However, another aspect is less studied - the impact of the body itself on changes in the size of clothing damage. The classical model of ballistic experiments involves shooting clothing separately from the human body simulator, which in turn can distort the morphology of the damage. In this regard, there is a need to conduct an experimental study using a complex consisting of two elements - clothing and a human body simulator - as a target.

*The aim* of the study is to compare the features of damage to leatherette as a complex "clothing + non-biological human body imitator" when shot from different distances using "Fort 12R" and "AE 790G1" pistols.

## Materials and methods

The work was performed within the framework of the research work of Vinnytsia National Medical University named after M.I. Pirogov at the expense of state funding from the Ministry of Health of Ukraine: "Characteristics of damage to human body tissue simulators caused by non-lethal weapons" (state registration number 0121U107924).

To conduct the ballistic experimental shooting, a model of using a target in the form of a non-biological human body imitator covered with a layer of leatherette was used. To simulate the human body, a 10% solution of food gelatin type A 270 Bloom (TM "Junca Gelatines SL", Spain) was used, made according to the method of M. L. Fackler and J. A. Malinowski (1985). [6]. A total of 30 blocks were made, measuring 30x15x15 cm, which were covered with a 200 μm thick plastic film to simulate human skin and then with a layer of leatherette before shooting.

The shooting of such complex targets was conducted at the Vinnytsia Research and Development Forensic Center of the Ministry of Internal Affairs of Ukraine at close range, 25 and 50 cm (10 blocks for each distance, respectively) using "Fort 12R" and "AE 790G1" pistols (5 blocks for each pistol out of 10 blocks for each distance) equipped with 9 mm ammunition (elastic traumatic bullets) within 30 minutes of removing the blocks from the refrigerator with preliminary fixation of the pistol in a vice.

The fired complexes "clothing + non-biological human body imitator" were photographed in accordance with the rules of forensic photography using a digital camera ("Alpha A6000 Sony" camera) with subsequent analysis of the damage to the leatherette in accordance with the generally accepted principles of forensic research.

## Results. Discussion

Shots fired at close range from the AE790G1 resulted in damage (minus tissue) to the leatherette material (Fig. 1), irregularly rounded, ranging in size from 0.8x0.8 cm to 1.1x0.8 cm. The edges of the lesion are uneven, fringed, in the form of small flaps. There are tears extending from the edges of the defect, sometimes cross-shaped, from 1.6 cm to 6.0 cm long at 12, 3, 6, or 9 o'clock, respectively, on the imaginary clock face. The threads of the fabric base protrude into the lumen to different lengths, are disheveled, thinned, and significantly melted with the formation of a flask-like swelling at the ends. The edges of the damage are slightly turned inward (in the direction of the bullet flight). Also, around the damage and on the threads inside the damage, single (2-4 pcs.) half-burnt and unburnt gunpowder particles of irregular oblong and hemispherical

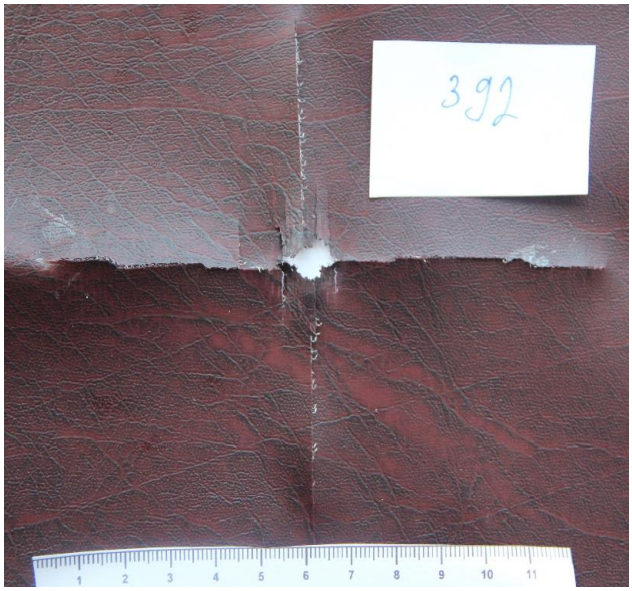


**Fig. 1.** Damage to the leatherette when shot at close range with the AE790G1.

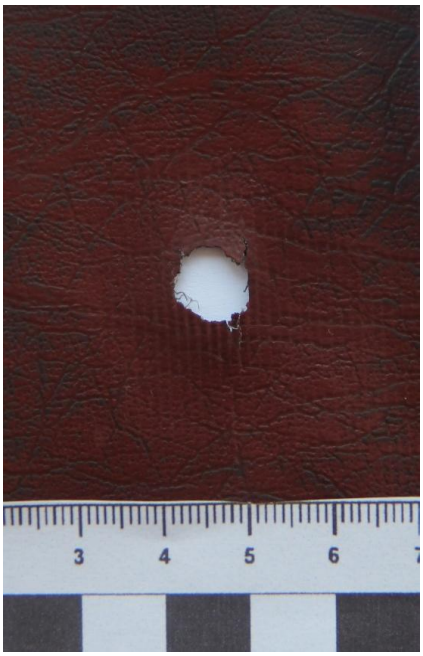

**Fig. 2.** Damage to the leatherette when shot with the AE790G1 from a distance of 25 cm.

**Fig. 3.** Damage to the leatherette when shot with the AE790G1 from a distance of 50 cm.

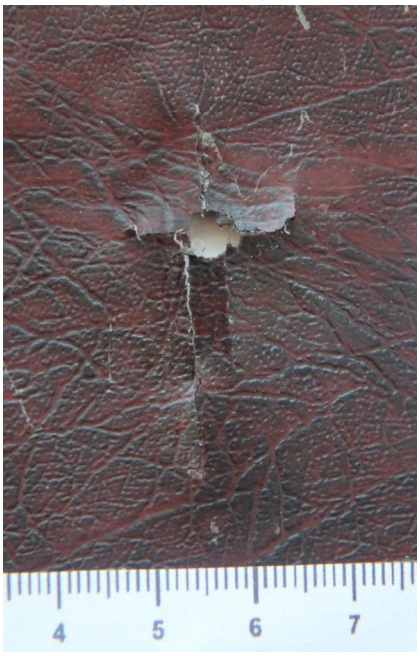

**Fig. 4.** Damage to the leatherette caused by a shot at close range from Fort 12R.

shape, gray in color, were found.

When fired from the AE790G1 from a distance of 25 cm, damage (minus tissue) is formed in the leatherette material (Fig. 2), round in shape, with dimensions ranging from 0.9x0.9 cm to 0.9x1.0 cm. The single end ends of the threads are disheveled and thinned, directed in the direction of the bullet flight. There is no melting of the fibers. Around the damage there is soot deposition up to 2 cm, which is detected only by microscopy. Also, unburned powder particles of spherical and elongated shapes were found around the damage (10-15 pieces).

When fired from the AE790G1 from a distance of 50 cm, damage (minus tissue) is formed in the leatherette material (Fig. 3), round in shape, with dimensions ranging from 0.9x0.8 to 0.9x1.0 cm. The end ends of the threads are similar to those described above. There is no melting of the fibers. Also, single (2-3 pcs.) half-burned dust particles were found around the damage.

Shots fired at close range from the Fort 12R caused damage (minus tissue) to the leatherette material (Fig. 4), round in shape, ranging in size from 0.6x0.6 cm to 0.6x1.7 cm. The edges of the lesion are uneven, fringed, in the form of small flaps. Tears, sometimes cross-shaped, extend from the edges of the defect, from 0.4 cm to 2.9 cm long at 12, 3, 6, or 9 o'clock, respectively, on the imaginary clock face. The threads of the fabric base protrude into the lumen to different lengths, are disheveled, thinned, and significantly melted with the formation of a flask-like swelling at the ends. The edges of the damage are slightly turned inward (in the direction of the bullet flight). Around the damage there is a concentric deposition of dark gray soot with a width of 0.4 cm to 0.6 cm and an outer diameter of 1.2 cm to 1.5 cm. Also, around the damage and on the threads inside the damage, single (2-4 pieces) half-burned and unburned gunpowder particles similar to those described above were found.

Shots from Fort 12R from a distance of 25 cm resulted in damage (minus tissue) to the leatherette material (Fig. 5), oval in shape, ranging in size from 0.7?0.9 cm to 0.8?1.4 cm. The single end ends of the threads are disheveled and thinned, directed in the direction of the bullet flight. There is no melting of the fibers. There were tears from the edges of the defect in the number from 0 to 3 up to 3.8 cm long at 12, 3 or 6 o'clock, respectively, on the imaginary clock face. Around the damage, there was soot deposits at a distance of 2 to 3 cm, which was detected only by microscopy. Also, single (1-5 pieces) unburned powder particles of spherical and elongated shapes were found around the damage.

Shots from Fort 12R from a distance of 50 cm resulted in damage (minus tissue) to the leatherette material (Fig. 6), oval in shape, ranging in size from 1.0x0.8 cm to 8.0x0.7 cm. The edges of the lesion are uneven. The end ends of the threads are similar to those described above. There is no melting of the fibers. Also, single (2-3 pcs.) half-burned dust particles were found around the damage.

The most indicative for proving the correctness of our theory that the presence of a human body imitator under clothing affects the morphology of damage to clothing is a comparison of our data with the results of the study by P. Yu. Bobkov et al. (2019), where the experiment model involved shots at a leatherette fixed in a frame [3]. The study was conducted using a Fort 17R pistol, which is similar in characteristics to the Fort 12R pistol we studied. The most


**Fig. 5.** Damage to the leatherette caused by a shot from Fort 12R at a distance of 25 cm.


**Fig. 6.** Damage to the leatherette after a shot from Fort 12R at a distance of 50 cm.

striking differences relate to the size of the defect, which did not exceed 0.5 x 0.5 cm when shot at close range, and the length of the breaks did not exceed 0.3 cm. In addition, there were differences in the size of the defect at shot distances of 20 cm and 50 cm, and at a distance of 20 cm, no tissue tears were detected.

Such differences in results can be explained by the effect of additional factors of the shot, namely, the gases released during the shot. When a sample of clothing is fixed in the frame of their passage through , the clothing is affected in a different way than if the clothing is placed together with a human body simulator. Given the damage we have described, we are talking about the accumulation of gases between the clothing and the body (its simulator), which creates more pressure on the clothing and, accordingly, causes larger tears and an increase in the size and number of defects.

This theory was partially confirmed in the experiment of V. Gunas et al. (2021), where, when shooting at a gelatinous torso of a person dressed in cotton knitwear, the authors recorded such phenomena as soot deposition on the inner surface of the clothing and the formation of volcano-like elevations of clothing above the level of the human body simulator, which also indicates the accumulation of gases between the clothing and the body [8]. At the same time, no similar formations were found in a study where cotton knitwear was attached to a frame [4].

V. D. Mishalov et al. (2016; 2018) drew attention to the particular importance of studying damage from short-barreled weapons [13, 14]. In particular, it was noted that it is critically important to study the characteristics of damage to clothing and to take into account clothing as an obstacle that can change the characteristics of damage to the human body. The topic of studying firearms and the injuries they cause became especially relevant after the beginning of the Russian invasion in 2014, which led to difficulties in the expert assessment of gunshot trauma [16].

V. Shcherbak (2014; 2015) made experimental shots using a Fort 12 pistol at different types of clothing at close range. The results of his research showed significant differences in the size of damage to different types of clothing, the number and length of clothing tears. At the same time, a full comparison of his data with the results of our study is not possible since leatherette was not used in his work [17, 18].

N. V. Bartoshyk (2016) conducted a study using hunting cartridges of 8 x 57 mm caliber [2]. The shots were fired from distances of 50 and 100 cm at targets consisting of cotton and mixed yarns. As a result, damage ranging in size from 0.3 x 0.5 cm to 0.6 x 0.7 cm was formed.

## Conclusions and prospects for further development.

When firing both the "Fort 12R" and "AE 790G1" pistols at the leatherette, which is part of the complex "clothing + non-biological human body imitator", a defect minus tissue is formed at all shot distances without forming a stamp (barrel mark).

When using the "Fort 12R" pistol, the formation of larger defects in clothing and more frequent tearing were observed, indicating that there may be differences in the design of the pistols, which in turn affects the formation of additional factors of the shot (in particular, gases) that change the characteristics of tissue damage.

It will be promising in the future to compare the features of damage to other types of fabrics that are most commonly used in the textile industry when shot at as a complex "clothing + non-biological human body simulator".

## References

[1] Abrahams, N., Mathews, S., Martin, L. J., Lombard, C., & Jewkes, R. (2013). Intimate partner femicide in South Africa in 1999 and 2009. *PLoS Medicine*, 10(4), e1001412. https://doi.org/10.1371/journal.pmed.1001412

[2] Bartoshyk, N. V. (2016). Судово-медична характеристика вогнепальних пошкоджень, спричинених мисливськими патронами калібру 8х57 мм, що споряджені експансивними кулями, з дистанцій 50 м та 100 м, та встановлення

наявності відкладання хімічних елементів в ділянках ушкоджень [Forensic description of caused by 8x57 mm hunting cartridges equipped with expanding bullets shot at 50 m and 100 m and study of chemical elements deposition in the area of damage]. *Journal of Education, Health and Sport,* 6(3), 41-47. http://dx.doi.org/10.5281/zenodo.47418

[3] Bobkov, P. Yu., Lebed, M. F., Perebetiuk, A. M., & Gunas V. I. (2019). Судово-медична характеристика вогнепальних пошкоджень шкірозамінника при пострілах із пістолета Форт-17Р [Forensic characteristics of damages to artificial leather caused by gunshots from a "Fort-17R" pistol]. *Буковинський медичний вісник - Bukovinian Medical Herald,* 23(2), 51-56. https://doi.org/10.24061/2413-0737.XXIII.2.90.2019.33

[4] Bobkov, P., Perebetiuk, A., & Gunas, V. (2019). Peculiarities of gunshot injuries caused by shots Fort-12RM pistol using cartridges of calibre. 45 Rubber. *Folia Societatis Medicinae Legalis Slovacae,* 9(1), 44-48.

[5] Chapman, S., Alpers, P., & Jones, M. (2016). Association between gun law reforms and intentional firearm deaths in Australia, 1979-2013. *Jama,* 316(3), 291-299. https://doi.org/10.1001/jama.2016.8752

[6] Fackler, M. L., & Malinowski, J. A. (1985). The wound profile: a visual method for quantifying gunshot wound components. *The Journal of trauma,* 25(6), 522-529. PMID: 4009751

[7] Galea, S., & Abdalla, S. M. (2022). State firearm laws and firearm-related mortality and morbidity. *JAMA,* 328(12), 1189-1190. https://doi.org/10.1001/jama.2022.16648

[8] Gunas, V., Bobkov, P., Plakhotniuk, I., Olhovenko, S., & Solonyi, O. (2021). Specifics of fire damage to cotton clothing while shooting point-blank at a human torso simulator from a Fort-12RM pistol. *Theory and Practice of Forensic Science and Criminalistics*, 23(1), 175-187. https://doi.org/10.32353/khrife.1.2021.13

[9] Kalesan, B., & Galea, S. (2017). Patterns of gun deaths across US counties 1999-2013. *Annals of epidemiology,* 27(5), 302-307. https://doi.org/10.1016/j.annepidem.2017.04.004

[10] Khoshnood, A. (2019). Holding Sweden hostage: firearm-related violence. *Forensic sciences research*, 4(1), 88-93. https://doi.org/10.1080/20961790.2019.1570665

[11] Matzopoulos, R., Groenewald, P., Abrahams, N., & Bradshaw, D. (2016). Where have all the gun deaths gone? *South African Medical Journal,* 106(6), 589-591. https://doi.org/10.7196/SAMJ.2016.v106i6.10379

[12] Mikhailenko, O. V., Roshchin, G. G., Dyadyk, O. O., Irkin, I. V., Malysheva, T. A., Kostenko, Y. Y., & Gunas V. I. (2021). Efficiency of Determination of Elemental Composition of Metals and their Topography in Objects of Biological Origin Using Spectrometers. *Indian Journal of Forensic Medicine & Toxicology,* 15(1), 1278-1284. https://doi.org/10.37506/ijfmt.v15i1.13592

[13] Mishalov, V. D., Khokholieva, T. V., Petroshak, O. Y., Hurina, O. O., Bachynskyi, V. T., Kryvda, H. F., & Kozlov, S. V. (2018). Особливості вогнестрільних ушкоджень, заподіяних сучасними набоями до короткоствольної зброї. Здобутки і перспективи досліджень [Features of gun damage caused by modern ammunition for short barrel weapons. Research achievements and perspectives]. *Судово-медична експертиза - Forensic medical examination*, (1), 55-62. https://doi.org/10.24061/2707-8728.1.2018.14

[14] Mishalov, V. D., Sukhii, V. D., Voichenko, V. V., & Kostenko, E. Ya. (2016). Паралелі між ушкодженнями, що заподіяні при пострілах еластичними кулями з пістолетів та револьверів, призначених для самооборони, і ушкодженнями, що заподіяні зі штатної вогнестрільної зброї [Parallels between injuries caused by elastic bullets from pistols and revolvers intended for self-defense and injuries caused by regular firearms]. *Судово-медична експертиза - Forensic medical examination,* (1), 41-45. https://doi.org/10.24061/2707-8728.1.2016.8

[15] Rivara, F. P., Studdert, D. M., & Wintemute, G. J. (2018). Firearm-related mortality: a global public health problem. *Jama*, 320(8), 764-765. https://doi.org/10.1001/jama.2018.9942

[16] Savka, I. G., Vanchulyak, O. Y., Lavrinenko, O. V., & Samoilov, D. V. (2018). Особливості вогнепальних поранень при пострілах із великокаліберної зброї [Features of gunshot wounds from large-caliber weapons]. *Клінічна анатомія та оперативна хірургія - Clinical Anatomy and Operative Surgery,* 17(4), 78-82. https://doi.org/10.24061/1727-0847.17.4.2018.14

[17] Shcherbak, V. V. (2014). Морфологічні особливості вогнепальних пошкоджень при пострілах впритул із пістолета Форт-12 в залежності від матеріалу одягу [Morphological features of gunshot wounds when fired at close range from a Fort-12 pistol depending on the material of clothing]. *Судово-медична експертиза - Forensic medical examination,* (1), 41-45.

[18] Shcherbak, V. V. (2015). Діагностичні ознаки пострілу із пістолета Форт-12 в межах близької дистанції [Diagnostic features of a shot from a Fort-12 pistol at close range]. *Судово-медична експертиза - Forensic medical examination,* (1), 47-50.

[19] Simon, T. R., Kegler, S. R., Zwald, M. L., Chen, M. S., Mercy, J. A., Jones, C. M., ... & Stone, D. M. (2022). Notes from the field: increases in firearm homicide and suicide rates - United States, 2020-2021. *Morbidity and Mortality Weekly Report,* 71(40), 1286-1287. https://doi.org/10.15585/mmwr.mm7140a4

[20] Sobreira, C., Klu, J. K., Cole, C., Nic Daeid, N., & Menard, H. (2020). Reviewing research trends - a scientometric approach using gunshot residue (GSR) literature as an example. *Publications,* 8(1), 7. https://doi.org/10.3390/publications8010007

[21] Stevenson, T., Carr, D. J., & Stapley, S. A. (2019). The effect of military clothing on gunshot wounding patterns in gelatine. *International journal of legal medicine,* 133, 1121-1131. https://doi.org/10.1007/s00414-018-1972-8

**ОСОБЛИВОСТІ УШКОДЖЕННЯ ШКІРОЗАМІННИКА ПРИ ПОСТРІЛАХ З ПІСТОЛЕТУ "ФОРТ 12Р" ТА "AE 790G1" З РІЗНИХ ДИСТАНЦІЙ**

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**Анотація.** *Експертиза пошкоджень, які спричинила вогнепальна зброя, завжди є складним викликом, що постає перед криміналістом. Причиною цьому є непередбачуваність взаємодії слідоприймаючої поверхні з боєприпасом, додатковими чинниками пострілу та залишковими компонентами пострілу, що, в свою чергу, викликано специфічною конструкцією різних видів вогнепальної зброї та особливостями складу різних видів боєприпасів, що також поєднано з різними чинниками, які впливають на передранову балістику (погодні фактори тощо), ранову балістику (різні види тканин тіла людини, різні матеріали перешкод, їх присутність тощо). Усі ці фактори вимагають детального вивчення. Мета дослідження - порівняти особливості пошкоджень шкірозамінника, у якості комплексу "одяг + небіологічний імітатор тіла людини" при пострілах із різних відстаней, використовуючи пістолети "Форт 12Р" та "AE 790G1". Експериментальне дослідження проведене шляхом виготовлення балістичних желатинових блоків, які покривали шкірозамінником і проводили відстріли з дистанцій впритул, 25 та 50 см, використовуючи пістолети "Форт 12Р" та "AE 790G1". При аналізі усіх відстріляних зразків шкірозамінника*

*виявлено утворення дефекту по типу мінус тканина, з утворенням дефекту круглої (здебільшого при пострілах впритул для обох пістолетів) або овальної форм (при пострілах з дистанцій 25 та 50 см для обох пістолетів). Утворення розривів характерні для дистанцій пострілу впритул для обох пістолетів та "Форту 12Р" при пострілах з дистанції 25 см. Для всіх дистанцій пострілу та обох пістолетів характерно відкладання залишкових компонентів пострілу у вигляді напівзгорілих чи незгорілих часточок пороху. Розміри дефекту мають приблизно однакові розміри, проте при застосуванні "Форт 12Р" зафіксовано утворення дефектів більших розмірів на всіх дистанціях пострілу. Таким чином при візуальному дослідженні, при порівнянні зразків шкірозамінника з усіх досліджуваних дистанцій виявлено значні відмінності між усіма досліджуваними групами, зокрема, між відповідними групами пістолетів, що робить можливим ідентифікацію пістолета вже при візуальному дослідженні зразку.*

**Ключові слова:** *пошкодження одягу, вогнепальна травма, вогнепальне поранення, пошкодження шкірозамінника, нелетальна зброя, імітатор людського тіла, вогнепальна зброя.*