ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Features of Distribution Scree Shot at Shots from Modern Semi-Automatic Smoothbore Hunting Guns: «Saiga 12» and Vepr «Molot».

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ABSTRACT

Some research data about the specifics of the formation and propagation of debris shot, as well as criteria for forensic evaluation of modern semi-automatic smoothbore hunting guns of 12 caliber are discussed in this article. Research data are based on a generalization of the forensic medical, forensic and hunting literature, as well as the study of factual material and experimental firings of some types of modern semi-automatic smoothbore hunting guns, in a manner of different types of equipment and gunpowder cartridges.
The article discusses the features of the criteria forensic evaluation of scree shot at shots from a modern semi-automatic smoothbore hunting gun of 12 caliber.
Keywords: Smooth-bore semi-automatic hunting gun, rifle shot scree, forensic medicine, additional shot factors, gunshot distance, hundred-submultiple target.

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ISSN: 0975-8585

ACTUALITY

In forensic practice study of the damages caused by firearms is an urgent problem nowadays. It is caused, first of all, by emergence of new samples of manual firearms, including hunting guns. Changing weapons design, shortening the barrel, muzzle brake application - compensators and more other thing lead to a change of the projectile ballistics, shows some features of soot deposits and additional shot factors, which in its turn is important for the expert evaluation of the distance, the identification of these weapons, and other challenges assigned to the expert forensic investigators.

The features of smooth-bore hunting guns damage [1, 2, 3] are adequately investigated in in forensic practice. There are some data about the types of damaging shot actions, dispersal of various kinds of fractions at certain distances, the maximum distance of shot flight, depending on its numbers, etc.

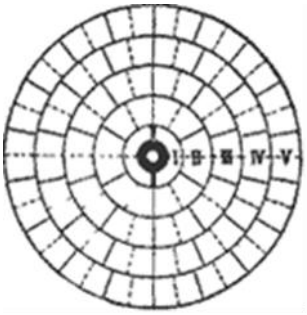
However, these studies are based on a study of rifles with one or two standard barrel length of 70-80cm. and do not have a semi-automatic loading mechanism. New models of semi-smooth-bore hunting guns, which are based on an army of small arms, have a number of design features that could significantly affect the ballistics of the shot, the formation of debris shot and shot additional factors [4, 5, 6, 7].

Special prevalence was received by semi-automatic guns MTs 21-12, MR – 153, 155, «Saiga 12», Vepr «Molot». With the advent of new samples of firearms there is a need for their detailed studying, that is carrying out a full complex of morphological and medico-criminalistics researches of the emerging damages [8, 9, 10].

Objective

The goal of our research is to reveal the peculiarities of the formation and dissipation of shot talus. To explore different shot distances from a modern semi-automatic smooth-bore hunting guns, such as Saiga 12, MR, and Vepr «Molot». To develop expert recommendations for forensic evaluation, shot distance.

MATERIALS AND METHODS



The hundred-submultiple target was developed by the engineer A.A. Zernov before the Great Patriotic War. The target is intended for quality check of shot guns flight. It represents the circle with a diameter of 80 cm divided into five zones with radiuses of circles of 8, 16, 24, 32 and 40 cm. The areas of zones are respectively equal to 2, 6, 10, 14 and 18 dm (1 dm is equal to 100 cm). Thus, the area of all the target is equal to 50 dm, or, more precisely, 5024 cm. All zones are divided into shares or segments. The area of one field is equal to 0.5 dm. The target, thus, has 100 segments or shares therefore it also carries the name of the hundred-submultiple.

There is an Apple in the center of the target- a circle with a diameter of 8 cm with a white circle inside with a diameter equal to 4 cm. In the center of the target is located apple - a circle with a diameter of 8 cm with a white circle inside diameter equal to 4 cm. Up and down the apple, to the intersection with the circle of the first zone, dark stripes were made with width of 8 mm, which are used for more precise aiming at verifying accuracy and accuracy of the battle rifle. Zones of the target are numbered from the center to the periphery by the Roman figures, and these 100 segments are distributed into the zones: the zone I contains 4 segments, II - 12, III - 20, IV - 28 and V - 36 segments. The target of the engineer A. A. Zernov serves for definition of the following indicators characterizing quality of the shot gun flight when firing at a distance of 35m:

- Close grouping of shots which is defined by quantity of the pellets which got to a circle with a diameter of 80 cm or percent of quantity of the pellets which got to a target in relation to total number in a shell;
- The uniformity of the talus, determined by the nature of the pellets` location on the entire area of the target, i.e. the number of segments affected by at least one pellet;
- The condensation to the center determined by the attitude of quantity of the pellets which got to area of I and II zones, towards quantity of the pellets which got to the area of the V zone, increased by correction coefficient - 2,25. Thus, the quantity of pellets of I and II zones should be divided into quantity of pellets of the V zone and this relation should be multiplied by 2.25;
- Constancy of shooting from a shot to a shot that is determined by checking of each shot in a series in accordance with three previous points;
- Density of a talus in a zone which is defined (for each zone) by division of quantity of the pellets which got to a zone in the area of all zone;
- The character of a talus determined by number of the struck segments in a zone.

We used in the experiment samples of weapons, such as «Saiga 12», Vepr «Molot», which had the original packaging with a short barrel and muzzle brake compensator. The muzzle brake is a device-compensator (DTC) was designed to reduce the recoil of the barrel (25-75 %), using the kinetic energy of the powder gases escaping from the barrel after released the projectile or bullet that changes the direction and speed of movement of a part of the powder gases escaping from the barrel after the departure of the projectile. Thereby it reduces the recoil impulse, and allows or to reduce the overall weight of the weapon, or to increase close grouping of shots [11, 12, 13].

Vepr «Molot» (http://www.molot.biz)

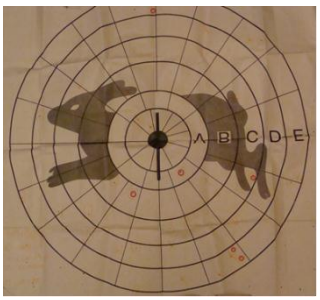
«Saiga 12» (http://www.izhmash.ru)

To compare research, we carried out some firing practice of the double-barreled gun IZH 27 and the smooth-bore semi-automatic guns MR-153 and MC 21-12. At firing practice we used the hunting cartridges of factory production of different forms, equipped with pellets No.5 and plastic wads containers such as «Pozis», «SKM-industry», «Iskra», «Anna», «Glavpatron», «Azot». When processing the received results, we used the standard methods of statistics with the help of the computer applied program Statistica 6.0 and Microsoft Excel program. . Reliability of the received results was estimated with use of t – Styyudent's criterion.

RESULTS

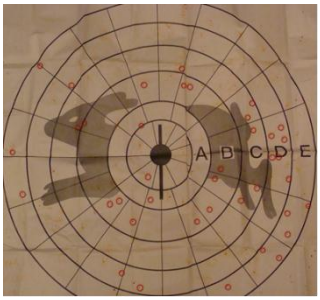
We carried out a number of experimental firing practices (186 shots) at targets made of cotton fabric and at 100 submultiple targets from smooth-bore semi-automatic guns of the 12 caliber, Saiga 12 and Vepr «Molot».

ISSN: 0975-8585



Vepr «Molot»12(430mm)

Vepr «Molot»12(+25 cm)



Saiga 12 (560mm)

According to experimental firing practice, and its results, we can say that using Vepr «Molot» at distance of 35 meters, with a shot barrel (430 mm), 5 pellets in a hundred-submultiple target are noted on average. By increasing the length of the barrel using a nozzle length of 25 cm, the number of hits increases to 25 pellets.

When firing with «Saiga 12» with barrel length of 580 mm at a distance of 35 meters, the number of hits was equal to 35 pellets. In all cases the factory muzzle brakes-compensators with narrowing of the barrel of 0.25 mm were used.

In the control firing from semi-automatic hunting rifles "MC 21-12", MP-153 and double-barreled shotguns IZH-27 with barrel lengths of 700mm without muzzle brakes-compensators and muzzle narrowing of 0.25 mm at a similar distance, the close grouping of pellets was at several times more up to 90 hits at a hundred-submultiple target using MC 21-12.

Table 1: Comparative table of averages expansion of scree shot

Mark of the gun	The pellet dispersion diameter in centimeters at distance in meters						Number of shots
	10m	15m	20m	25m	30m	35m	
Saiga 12	30±2,7	40±3,5	50±1,7	60±2,6	70±4,2	80±2,4	46
V-Molot 12	70±1,6	80±2,6	More 80±4,7				47
V-Molot 12 with a barreled nozzle	30±4,5	50±1,7	60±3,1	70±1,4	80±1,9	80±4,3	47
MC 21-12	20±3,8	30±4,3	40±2,8	50±3,3	70±3,6	80±3,6	46

DISCUSSION

The big difference in the shot talus may be due to the difference in the length of the barrel. However, this hypothesis has not been confirmed. When we used in experimental firing two guns differing only in the length of the barrel, such as, Fabarm Axis with a barrel length of 610mm and Fabarm Axis with a barrel length of 810mm (chambers of both guns were 76mm, drilling Tribore, with narrowing of the barrel of 0.9 mm) there is a decrease of the close grouping of pellets only in 5%, whereas the difference in barrel length is 200mm. So, long barrel differs from short barrel in 25% [14].

In our studies, this hypothesis is reflected as an increase to the length of the barrel, also increases the probability of hundred-submultiple target. During the statistical analysis of correlation between the length of

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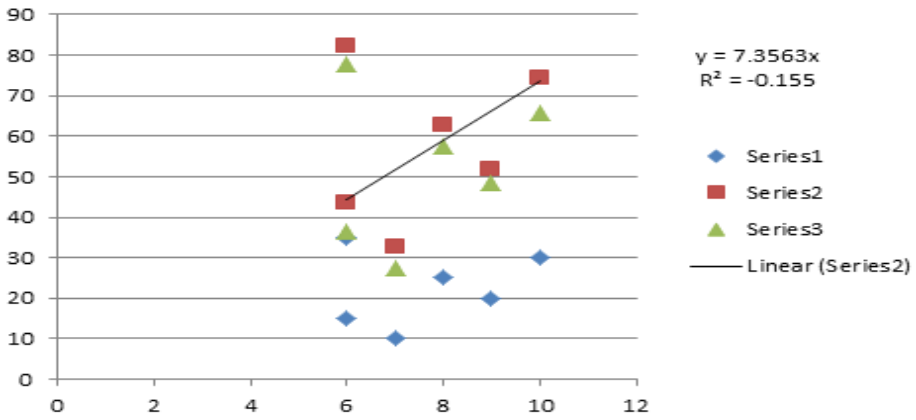
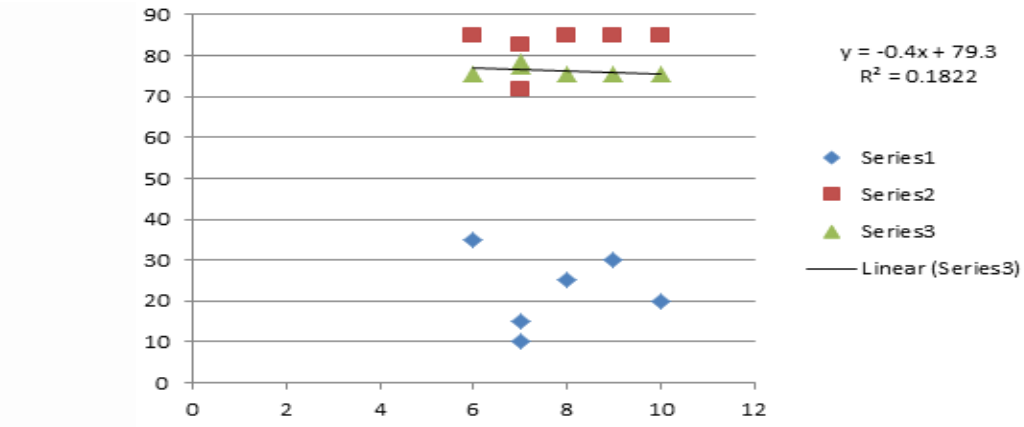
the barrel and the number of hits, it is noted that when using a gun brand "Saiga 12", the correlation coefficient is equal to 1, which indicates a strong correlation between the two parameters.

Picture 1: Correlation with using Saiga 12

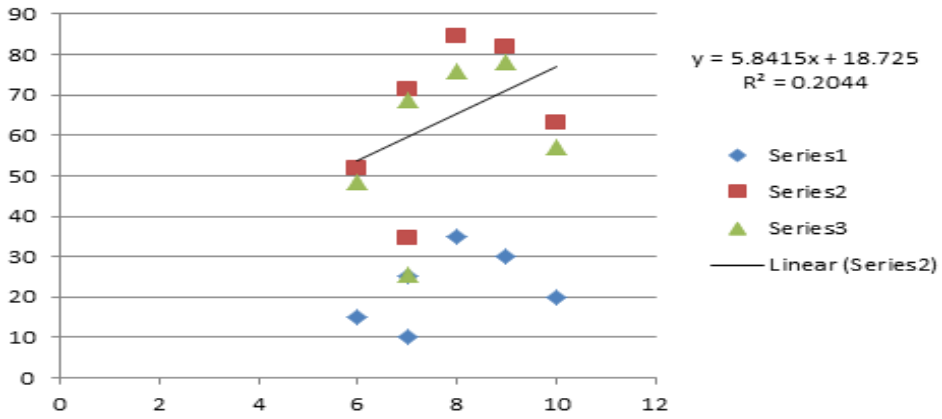


When firing from the Vepr "Molot-12" and the receiver using a nozzle - the correlation coefficient is 0.65, and 0.96, respectively, which also confirms this hypothesis.

Picture 2: Correlation with using Vepr "Molot-12"



Picture 3: Correlation with using V-Molot 12 with a barreled nozzle



When control shooting semi-automatic hunting rifles, "MC 21-12" - the correlation coefficient - 0.99, which is also confirmed by statistics.

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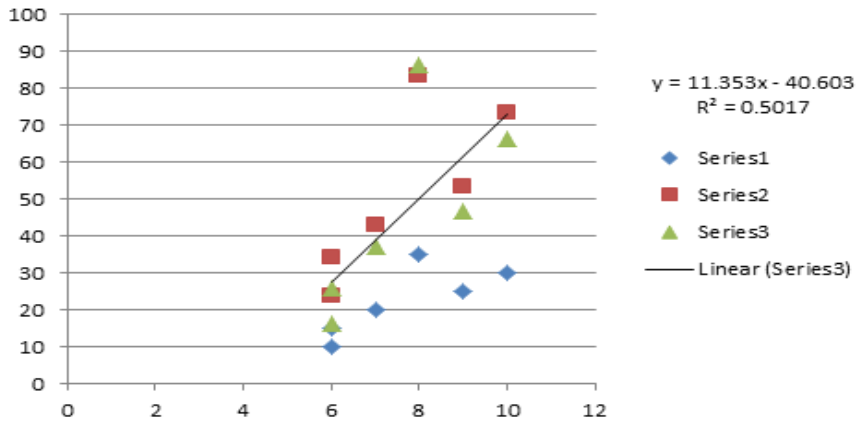
Picture 4: Correlation with using "MC 21-12"



In the initial period of the shot, the pressure of the powder gases is growing especially quickly when shot shell for some time motionless, counteracting the pressure of powder gases by its own momentum peace and rolling resistance of the liner. The ongoing build-up of pressure from the moment of ignition of the powder charge before disclosing is called rolling pressure forcing. The heavier the projectile, i.e. the greater its mass, and therefore inertia of rest, and the stronger pinning his rolling in the sleeve, the faster is the growth pressure and forcing more of its value. The overload at such acceleration will make 462400/9.81 = 47135 g, and it means that during action of acceleration on an initial site of a way quickly inertial mass of a shell more than in 47 thousand times exceeds its weight at rest. Such terrible weighting of a shell and, therefore, each its component - a pellet causes considerable deformation of shot. Most deformed are rear pellets of a shell located between the head part of the projectile and a powder wad, sending enormous pressure of powder gases, creating tremendous acceleration. It is impossible to exclude the possibility of damaging some shot during its passage through the muzzle narrowing, but if to determine the magnitude of acceleration and overloads that act on the projectile shot at the end portion in the bore path, the acceleration will be around 10 m / s2, and the overload will be slightly more than 1g. Slight overload, creating weak compression in a shot shell, allows a shot to reconstruct at the entrance of muzzle narrowing without any significant mutual damage. Thus, there can be additional damage of a shot at the time of its movement inside the barrel channel of a shot shell, but its specific weight in a total amount of deformation, especially in case of using containers, cannot be compared with the time of an initial stage when the shell still is in a catridge [15,16,17].

CONCLUSIONS

Thus, according to the data of the experiment we can be assumed that the presence of the muzzle brake compensator causes slowdown of shot projectile at the muzzle and can create additional overload of the back of the shot continue its movement and thus further distorting the fraction that subsequently negatively affects its ballistics and lead to a significant expansion of the area.

REFERENCES

[1] Choi V.A. Concept and classification of modern firearms // Actual problems of improving the legislation of the Republic of Kazakhstan in the field of forensic activities. International scientific and practical conference. - Almaty, 2007. - p. 172-176.

[2] Choi V.A. Modern research opportunities smooth-bore hunting weapons // Problems of development Criminology and Forensic expertology. Materials International scientific and practical conference. - 2007. - p. 70-73.

[3] Forensic examination of gunshot injuries // Avdeev M.I. Moscow. 1959. - p. 182-235.

[4] Belyaev V.I. Some observations of the shot and the damage shotguns // Collection of scientific papers on Anniversary of Yaroslavl Medical Institute. - 1954. - S. 359-364.

[5] Forensic medicine // Gurochkin YD Deriagin GB Moscow. 2008. - S. 435.

[6] Lisitsyn AF Traces close shot of hunting smooth kostvolnogo guns (experimental research) // Theory and forensic practice. Moscow. 1958. - S. 187-201.

[7] Forensic medicine // V.L. Popov Saint - Petersburg. 2001. - S.201-210.
[8] Forensic ballistics // Popov V.L., Shigeo VB, Kuznetsov LE Saint - Petersburg. 2002. - S. 65-72.
[9] Smusin YS Estimated table to determine the distribution standing shot from shotguns caliber 12, 16 and 20 // Collection works of the Department of Forensic Medicine. Leningrad. 1955. - P. 23-37.
[10] Forensic Medicine. // V.N.Kryukova. Moscow. 2009. - S. 56-68.
[11] Forensic medicine. // V.V.Tomilin. Moscow. 2009. - S. 145-164.
[12] Forensic medicine: // YI Pigolkin. Moscow. 2012. - P. 92-102.
[13] M.Dektyarev Barrel length rifles and shot speed // Journal "Kalashnikov". 2013.
[14] Forensic medicine. Khokhlov VV Smolensk. 2010. - S. 224-231.
[15] Choi VA Some new ballistic characteristics samples firearms hunting weapons // Habarshy-Herald Kazakh National University. Al-Farabi. - 2007. - № 4 (44). - S. 67-74.
[16] Choi VA Integrated studies smoothbore hunting weapons // Economics and Law of Kazakhstan. - 2008. - № 11. - S. 41-43.
[17] Integrated studies smooth-bore hunting weapons // Economics and Law of Kazakhstan. - Almaty, 2008. - № 11. - S. 41-43. 2005 - S.292-293.