

CASE REPORT

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9 mm Ammunition Used in a 40 Caliber Glock Pistol: An Atypical Gunshot Wound*

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ABSTRACT: Atypical gunshot wounds due to ricochet and intermediate targets have been well described in the literature. We represent a case of suicide with an atypical entrance wound and bullet without rifling marks due to 9 mm ammunition being loaded and fired from a 40 caliber semiautomatic pistol.

KEYWORDS: forensic science, ammunition, rifling, gunshot wound, caliber

History—The deceased is a 20-year-old black male who reportedly was upset after getting into an argument with his girlfriend. He made four suicidal threats, then produced a handgun and shot himself in the right side of the head.

Autopsy—A penetrating gunshot wound to the head with an entrance in the right parietal scalp is located $2\frac{3}{4}$ in. below the top of the head and $\frac{3}{4}$ of an inch behind the external auditory canal. The entrance wound is 5 mm in diameter and circular, with an eccentric 4 mm in diameter abrasion collar at the 7 o'clock position (see Fig. 1). The edges of the wounds are blackened and seared. In the skull is a 7 mm in diameter, slightly oval, internally beveled perforation with a small amount of grayish-black material deposited around the bone. The projectile track extends through the right inferior parietal lobe, through the basal ganglia, and exits the brain at the left superior temporal lobe. At the termination of the wound track, a nickel jacketed hollow point projectile is located. The projectile is slightly deformed with no discernible rifling marks (see Fig. 2). A large amount of unburned powder is in the wound.

Firearm—The firearm is Glock Model 22, 40 caliber semiautomatic pistol. At the scene, the pistol had a fired 9 mm case still

in the chamber. The 9 mm case is expanded at its distal portion to match the diameter of the 40 caliber chamber (see Fig. 3) and has unburned powder and blood within the casing. The magazine contains additional 9 mm Silvertip® rounds (see Fig. 4).

Test Firing and Results—The 40 Smith and Wesson cartridge was developed in the late 1980's as a direct result of Federal Bureau of Investigation ammunition testing. The FBI tests found that a reduced 10 mm load best met their performance requirements (1).

Smith and Wesson felt that with the reduced load the 10 mm case could be shortened and still achieve the same performance. This would allow the firearm for which it was chambered to be smaller. The 10 mm case was shortened from 0.992 to 0.850 inches. As a result the newly created 40 Smith and Wesson cartridge length closely matched that of the 9 mm parabellum cartridge; therefore, the magazines and frames of 9 mm and 40 caliber firearms could be of similar dimensions. Not surprisingly, most 40 caliber magazines will fit 9 mm cartridges and vice versa.

The firearm fed and fired 40 caliber ammunition in a normal fashion. It was found to hold and manually feed 9 mm ammunition. The 9 mm rounds fit into the Glock 22 magazine and would feed manually into the chamber. The case heads and primers were held firmly against the breech face by the extractor. The gun would fire with reasonable reliability (1 misfire in 37 rounds) with 9 mm ammunition, but the empty cases would have to be ejected and new rounds loaded by operating the slide by hand. The fired casings were all expanded to 40 caliber and 25 of the 37 casings were partially split. The firing pin imprints were eccentrically located on the primer.

High speed photography showed considerable projectile yaw, even when the bullet was within the barrel (see Fig. 5). There was considerable gas and powder blowby. At greater distances the yaw was much more pronounced and tumbling eventually ensued (see Fig. 6).

A chronograph was used to measure the velocities of the projectiles. The velocities of our test sample of 124 grain 9 mm Silvertip® rounds were reduced from an average of 1124 feet per second in a nearly identical control 9 mm firearm to an average of 432 feet per second in the test firearm.

Discussion

The eccentric abrasion and lack of tearing around the entrance wound is atypical for a 9 mm or 40 caliber contact gunshot wound

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FIG. 1—Contact entrance wound on right scalp with eccentric marginal abrasion.



FIG. 4—40 caliber Glock magazine holding 9 mm cartridges.

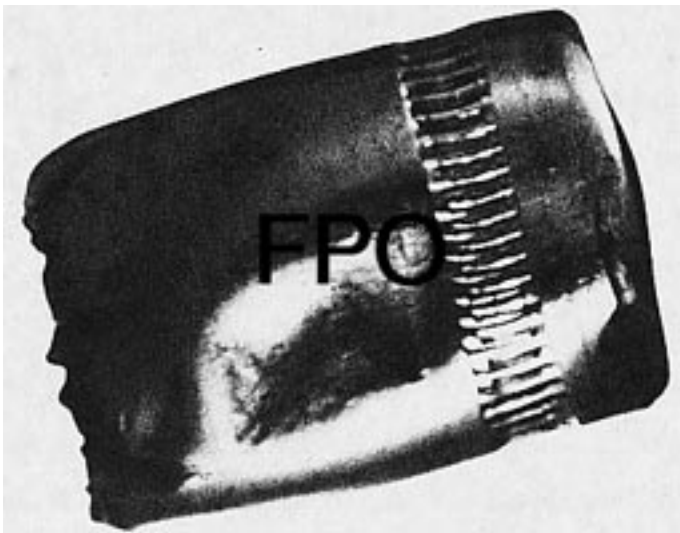


FIG. 2—9 mm Silvertip® projectile with slight deformation and lack of rifling.



FIG. 3—9 mm casing fired from 40 caliber Glock pistol showing expansion.



FIG. 5—High speed photograph of 40 caliber Glock pistol firing 9 mm ammunition from a Ransom rest. Note bullet yaw and powder blowby.

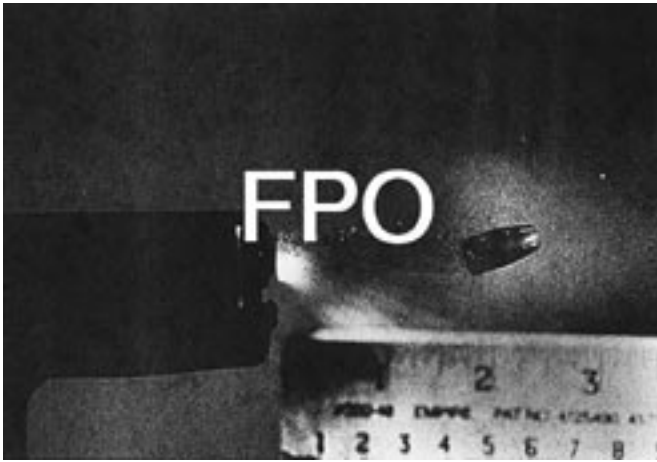


FIG. 6—High speed photograph showing considerable projectile yaw and unburned powder.

over bone (2). Medium caliber contact wounds over the skull typically produce tearing of the skin. If not for the powder, soot, etc., the wound would have appeared similar to a distant atypical wound. The lack of rifling on the projectile and lack of expansion are also unusual.

The eccentric abrasion at the entrance wound is more typical of a ricochet or tangential entrance wound. With hollow point projectiles, tangential entrances often show central tags (3). No central tags were present in this case.

These atypical findings are due to 9 mm ammunition being fired in a 40 caliber pistol. The powder blowby noted in the high speed photographs due to the smaller caliber projectile would predictably significantly reduce chamber pressure and therefore bullet velocity. The Winchester silver-tip cartridges were reduced in velocity from near the speed of sound to 432 feet per second, approximately twice the velocity necessary to penetrate skin (4). The predictable loss of chamber pressure and, therefore, velocity may partially account for the lack of bullet expansion and the lack of skin tearing

at the periphery of the entrance wound. Bullet yaw may also explain the atypical deformation and lack of expansion of the projectile. At a distance loss of bullet velocity and accuracy would predictably be dramatic.

Lack of bullet rifling on the projectile would present particular difficulty when trying to identify the firearm from which it was fired.

Also, once again due to the loss of chamber pressure, the 9 mm cases were contained within the 40 caliber firearm after firing instead of being ejected as would be expected in a properly functioning semiautomatic pistol. Unless the slide was manually operated, no cases would be found at the scene. These factors would present difficulties to a homicide investigation.

This case presents a particular problem to the forensic pathologist in that it involves a wound with the features of a contact gunshot wound, including searing, powder, and soot within the wound, while also having features of an atypical or ricochet gunshot wound with an eccentric abrasion margin and a slightly deformed non-expanded bullet that lacks typical rifling patterns. The lack of rifling could also present problems to the criminologist.

Acknowledgments

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