CASE REPORT

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Chasing the Casing: A 38 Special Suicide

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ABSTRACT: Multiple self-inflicted gunshot wounds of the head are uncommon. Detailed history, scene investigation, autopsy findings, consideration of ballistics, and evidentiary proceedings are necessary to determine the manner of death in these cases.

This report involves a pattern of atypical, self-inflicted bullet wounds of the head of a 26-year-old male. Investigation confirmed that a single eyewitness and several earwitnesses reported a single discharge of a firearm. The eyewitness testified that the decedent singly discharged a Smith & Wesson revolver, caliber .38 Special, to the right side of his head after interposing several objects between the muzzle and his skin immediately prior to discharge. He was declared brain dead two days later.

At necropsy two contiguous atypical entry wounds were present in the right preauricular temple. The inferior wound was interpreted to be a near contact wound. The gray metal slug fragmented, creating separate tracks to the right maxillary sinus and the mid left posterior cerebrum, respectively. The larger, atypical wound of entry was associated with passage of the projectile through the right temporalis muscle and squamous temporal bone. The projectile, consisting of a slightly distorted empty metallic cartridge case containing a "live" primer, was recovered from its point of final lodgment in the right temporal lobe.

The literature addressing paired entry wounds following single discharge of the firearm with interposed targets is relatively sparse. Cases reporting multiple bullet wounds involving suicide are only sporadically reported. This report summarizes the investigative findings supporting the determination of the manner of death and revealing the interesting origin of the "misplaced" casing.

KEYWORDS: forensic science, forensic pathology, atypical gunshot wounds, wound ballistics, suicide, interposed targets

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Suicide with multiple gunshot wounds (GSW) is relatively rare. When the medicolegal investigator is faced with a death involving multiple GSWs in the setting of a probable suicide, a thorough investigation must be performed in order to exclude homicide or accident as the manner of death. Atypical gunshot entrance wounds, in addition to aiding in the determination of the muzzle-target distance, may not only provide clues to the character of the weapon and ammunition, but also support the conclusion that an interposed target was involved. Two atypical gunshot entry wounds, one rendered by fragments of a single .38 caliber bullet and the second rendered by other fragments of the same bullet and an interposed target—combined with the circumstantial evidence—establish the manner of death in this case as a suicide.

Case History

A 26-year-old white male was unresponsive in his trailer after sustaining a GSW to the head. He had been previously witnessed drinking alcoholic beverages in the presence of an acquaintance throughout the day, and after arguing earlier with his father, stated that he knew how ". . . to take care of this matter." According to this sole eyewitness, he subsequently placed a soft zip-up pistol pouch to his right temple, which was immediately followed by the single discharge of a handgun. Several earwitnesses who where close to the decedent's residence heard only a single shot. Officials reached the scene of injury prior to the arrival of the Emergency Medical Services (EMS), observed a neighbor assisting the victim lying unresponsive on the floor, and recovered a caliber .38 Special revolver, a pistol pouch, and several live rounds adjacent to his body. After arrival of the EMS, cardiopulmonary resuscitation was initiated and he was transported to a local hospital. His initial blood alcohol level (approximately 26 minutes after the event) was 136 mg/dL. Two days after sustaining the head injury, he was declared brain dead.

Six years prior to the decedent's death, he had attempted to commit suicide by shooting himself in the abdomen. He also had a significant psychiatric history involving substance abuse and depression, both of which had been treated in the past.

Radiographic Findings

A premortem cranial computed tomographic (CT) image revealed the following two separate and distinct wound tracks with associated shrapnel: the first track coursed to the right maxillary sinus, and the second bifurcated tracks extended from the right

temporal lobe to the left parietal cerebrum (where a casing was lodged). Cerebral edema, fourth ventricular hemorrhage, and a left subdural hematoma were also identified. A premortem anteroposterior skull radiograph illustrated the respective transcerebral and right midfacial tracks as seen in the composite CT scan (Fig. 1).

Postmortem anteroposterior and lateral skull radiographs confirmed the shrapnel placement and presumptive migration of the casing from the left cerebrum to its final lodgment in the right temporal lobe during the agonal period.

Autopsy Findings

Two cutaneous GSWs were present on the right side of the decedent's face in the region of the sideburn (Fig. 2). One circular wound of entry, located at the right zygoma, measured 0.6 cm ($^1/_4$ inches) in diameter and was surrounded by an eccentric red marginal abrasion. Focal aggregates of carbonaceous smoke/soot were deposited along the inferior marginal abrasion. Although no distinct circumferential powder stippling or tattooing was noted, focal clusters of punctate abrasions compatible with "pseudostippling" were present inferior and superior to the cutaneous wound. Portions of the projectile perforated the right zygoma and entered the right maxillary sinus, where a small flattened 1.6 cm ($^5/_8$ inches) diameter lead fragment was recovered. The direction of the track was from right to left, without significant upward/downward angulation or anterior/posterior deviation. In close proximity to the cutaneous entry wound, below the skin, a 0.3 cm ($^1/_8$ inches) diameter irregular lead fragment was also recovered.

The other, markedly atypical cutaneous wound, was located in the right temple, posterosuperior to the aforementioned smaller wound with slightly less than 0.6 cm ($^1/_4$ inches) intact epidermis separating the two. This wound consisted of an irregular rectangular ("D"-shaped) laceration of skin measuring 1.1 cm ($^7/_{16}$ inches) in greatest dimension. Multiple cutaneous abrasions were present around the entrance wound with moderate amounts of carbonaceous smoke/soot deposition at the periphery of the posterior abraded margin. As with the anteroinferior wound, no distinct circumferential cutaneous powder stippling or tattooing was noted. The internal track perforated the right temporalis muscle and right squamous temporal bone, thus entering the cranial cavity. The osseous entry wound was oval, measuring 1.9 cm ($^3/_4$ inches) in greatest dimension. Beveling of the endocranium was evident. Smoke deposition was grossly obvious at the margin of the wound and also at the lacerated margins of the subjacent dura mater. A slightly distorted but intact brass-colored metal casing was embedded within the right midtemporal lobar gyrus with its base directed posteromedially.

FIG. 2—*Close view of the paired atypical gunshot wounds of entry in the right facial temple.*

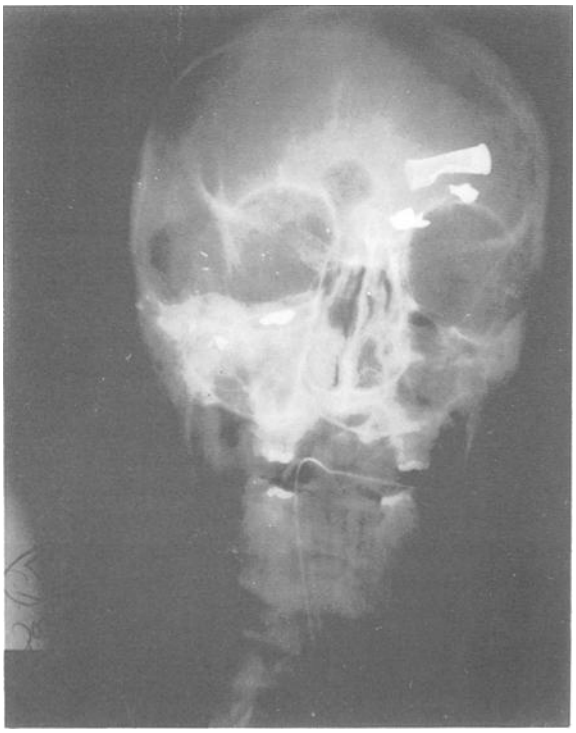

FIG. 1—*Premortem anteroposterior skull radiograph depicting location of projectile fragments and intracranial casing.*

In addition, separate hemorrhagic lacerations progressed from the temporal lobe and fanned out discretely into the left parietal subcortical white matter where two mangled lead bullet fragments were recovered, measuring 1.0 cm ($^3/_8$ inches) and 0.6 cm ($^1/_4$ inches) in diameter. The overall direction of travel of the fragmented projectiles was from right to left, with moderate upward angulation.

Ballistics Investigation

Received from investigators at the scene was a caliber .38 Special Smith and Wesson 5-round capacity revolver, model 49, containing one expended cartridge case and four rounds of live ammunition of the same caliber. Barrel length was slightly less

than 5.1 cm (2 inches). The gun's cylinder rotation was to the left (counterclockwise) when viewed from the rear. The rifling was 5-right. No malfunctions of the revolver were noted during examination or testing, and it was deemed to be in excellent condition. The spent cartridge casing in the revolver was positively identified as being fired in the weapon in question due to a reproducible spherical firing pin indention and breech face markings.

From the postmortem examination, a single cartridge case (Frontier brand 38 SPL) with live primer and four lead bullet fragments weighing 116 grains in toto were submitted for laboratory evaluation. The bullet fragments could not be identified or excluded as having been fired from the weapon in question. Microscopic markings of a comparative value were scarce due to mutilation and fragmentation. Similarities were noted in visible class characteristics. The cartridge case recovered at autopsy was positively eliminated as having been fired in or from the revolver in question due to the absence of any significant indentation or markings on the "live" primer face or cartridge rim edge from the revolver; however, smears of lead on the exterior of the casing were identified (Figs. 3*A* and 3*B*)

A brown fleece-lined soft pistol pouch with a zipper closure was recovered from the scene of injury and subsequently determined to belong to the decedent. Upon laboratory investigation, it contained one round of live ammunition composed of 2.3 grains of powder and fashioned in a lead "wadcutter" configuration. A blown-out area at the front end of the pouch was noted, and internal examination revealed carbonaceous smoke/soot deposition encompassing two separate elongated holes measuring approximately 0.8 cm ($^5/_{16}$ inches) and 1.1 cm ($^7/_{16}$ inches) separated approximately 1.0 cm ($^3/_8$ inches) apart. A smoke/soot deposit line located approximately 5.6 cm ($2^3/_{16}$ inches) from the holes was found on the fleece of the pistol pouch (Fig. 4). Microscopical examination confirmed the presence of visible flakes of unburned powder in addition to dried blood, flesh and hair. Chemical testing (sodium rhodizonate) and microscopical examination afforded positive identification of lead particulate material in these sites.

Discussion

This case is unusual for several reasons. Foremost among these is the intracranial recovery of a bullet casing. Secondly, the presence of dual wounds of entry upon witnesses' reports of a single discharge of the weapon requires a thorough search for a scientifically satisfactory explanation. Thirdly, atypical wounds of entry do not necessarily preclude a single discharge of the suspect weapon. Similarly, one must not automatically assume that multiple GSWs define a homicide.

Hudson addressed this issue by conducting a review encompassing seven years' experience at the Office of the Chief Medical Examiner in North Carolina. He evaluated 7895 GSW deaths (including 3522 suicides by firearms) in order to determine how many suicides actually involved multiple GSWs. Of those fatalities, 0.7% multishot firearm deaths and 1.6% multishot firearm suicides were represented in all multishot firearm suicides. In addition, 0.09% of all GSW victims sustained more than one GSW to their heads and 0.2% were actually attributed to multishot cranial firearm suicides (1).

In this case we postulate that at least two interposed targets were involved in the formation of the pair of unusual wounds: the unused casing and the leather pouch which held the revolver. The sooty line found in the fleece of the soft gun pouch is the gap between the barrel and cylinder, which provides additional physical evidence of the firing of the revolver from within the pouch. Beyond that, the design of this revolver incorporates a "hammer shroud" to prevent the hammer from snagging when the revolver

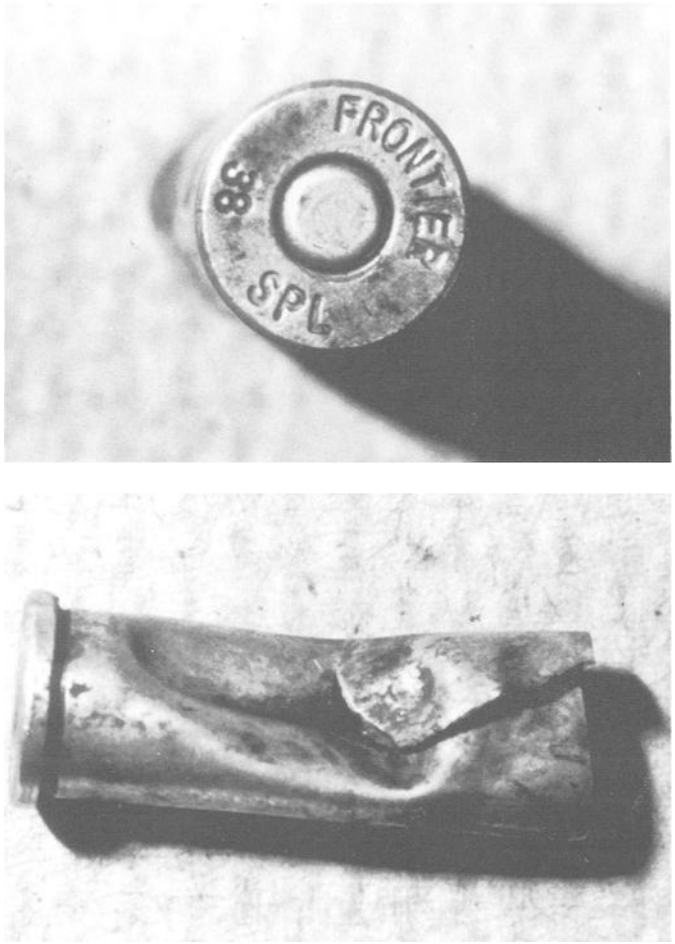

FIG. 3A—*Basilar view of the "live" cartridge recovered from the right temporal lobe at autopsy; note absence of markings or indentations on the head stamp, and* B—*lateral, exterior view of the casing with distorted contour in area of rupture and patches of lead smears.*

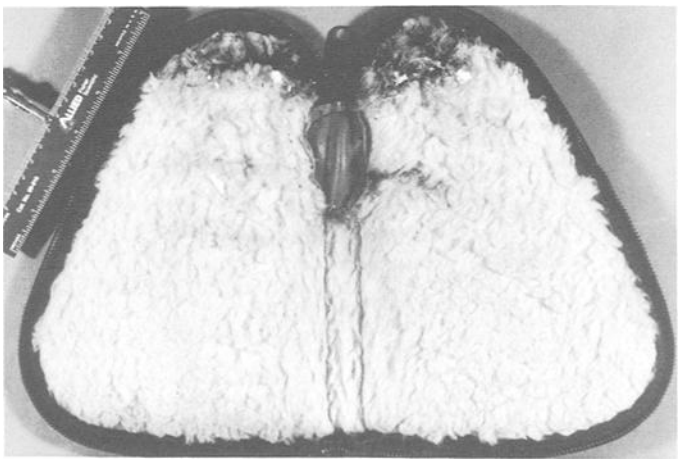

FIG. 4—*Opened pistol pouch exposing deposition of carbonaceous material at two locations: 1) the upper front end where two discrete perforations are present; and 2) a separate linear deposit of smoke/soot on the fleece created by the cylinder gap of the revolver.*

is worn under clothing. This feature would prevent the sides of the pistol pouch from hindering the movement of the hammer.

Interposed targets not only change the configuration and integrity, but also alter the flight characteristics of the primary projectile, thus creating peculiar entry wounds (2). Secondary projectiles arising from interposed objects in turn may contribute to the complexity of the injury pattern. Investigators studying GSWs resulting from interposed targets have noted that many are "D"-shaped and possess irregular marginal abrasions (3). When an atypical entrance wound of this type is encountered at autopsy, one's first impression may be that the wound is a reentry wound (4). Therefore, a high index of suspicion and a thorough examination searching for other sources of the atypical wound must be performed.

The finding of a slightly distorted, but essentially complete casing as an interposed target resting loosely within the cranial cavity is quite unusual. Interposed targets are prevalent and are often mutilated due to the forced impact from the primary missile in its flight. If the interposed target is placed into the chamber ahead of the ammunition, it does not appear to become as markedly distorted because the bullet has not reached its maximum velocity. These close intermediary targets, expelled with the bullet from the barrel, are termed accessory projectiles and are described by Smith et al. and Challener et al. in two separate case reports (5,6). A recent case report with radiographic features similar to this case illustrates how a metal casing became an accessory target due to the malfunctioning of a home made zip-gun (7). Malfunctioning weapons may give rise to the discharge of more than one bullet at the same time. Tandem bullet firing may be due not only to misfire but to faulty ammunition (8,9). In the case at hand, this scenario is highly unlikely because the weapon used was in excellent condition and the appropriate ammunition (the right type) was found with it.

The circumstantial evidence in this case was also critically important in establishing suicide as the manner of death (10). The decedent's psychiatric history and prior suicidal attempt in 1986 made the determination of the manner of death much clearer. In addition, the decedent was intoxicated as a result of immoderate alcohol consumption prior to participating in a heated argument with his father. Immediately afterwards, he picked up a loaded .38 caliber revolver that was still placed inside a leather gun pouch and shot himself once in front of one eyewitness. Several earwitnesses heard only one shot. Within the revolver pouch, a single round of live ammunition was found, indicating that he also stored projectiles, such as extra bullets and an unfired casing. In this instance, both the casing and the pouch closely apposed to the muzzle of the revolver constituted interposed targets. Circumstantial evidence is extremely important in evaluating difficult cases. Smith et al., Challener et al. and Marsh et al. considered the background inquiry and scene investigation heavily when establishing the manner of death in their similar case reports (5,6,11).

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