CASE REPORT

Todd C. Grey,[1] *M.D.*

The Incredible Bouncing Bullet: Projectile Exit Through the Entrance Wound

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ABSTRACT: A case of a suicidal gunshot wound of the head where the projectile ricocheted within the calvarium and exited through the entrance wound is reported. Findings at the scene and from examination of the victim and the suspect weapon are presented and discussed.

KEYWORDS: forensic science gunshot wound, suicide, internal ricochet

In this report, a case of gunshot wound suicide where the bullet ricocheted within the calvarium and exited through the entrance wound is presented. While internal ricochet is not uncommon in gunshot wounds of the head, it is believed this is the first reported case that documents findings that prove that the projectile exited through the entrance wound after striking the inner surface of the skull and bouncing back along the pre-existing wound track.

Case Report

A 34-year-old woman with a history of threatening to commit suicide was found dead in her bed. A large, gaping gunshot wound was present in the right temple. A .38 caliber revolver with a 2.5 inch barrel was lying on the blood-soaked bedding to the right of the victim's head and adjacent to the upraised right arm. Also found in this area was a deformed, unjacketed, medium caliber projectile. Initial examination of the weapon revealed a single expended cartridge beneath the firing pin, five unexpended rounds in the cylinder and blow back of blood within the barrel.

The victim was taken to the Office of the Medical Examiner for further examination. A radiograph of the head was obtained, showing a scattering of small projectile fragments distributed in a roughly linear fashion from right to left in an AP view, as well as extensive fracturing of the calvarium. No major projectile mass was seen. Examination of the decedent's head revealed a contact range gunshot wound of the right temple (Fig. 1). The overall dimensions of the wound were 2.5 cm in the vertical plane and 2.5 cm horizontally. A margin of abrasion measuring 0.3 cm extended clockwise from the 1

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[1]Chief Medical Examiner, State of Utah, Office of the Medical Examiner, Salt Lake City, UT.

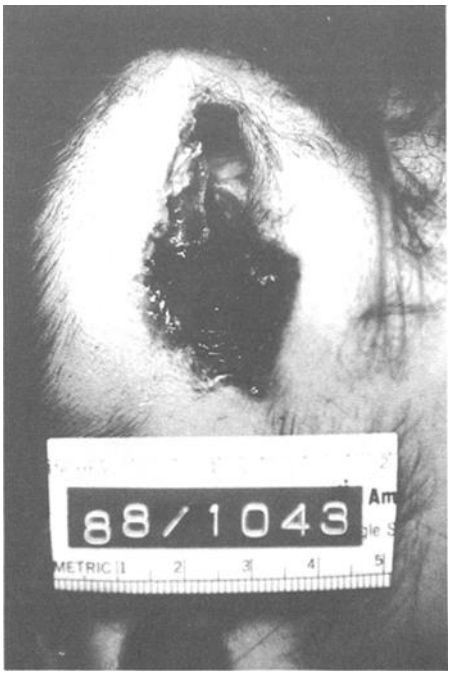

FIG. 1—*Entrance wound of right temple after cleaning and shaving. (Case number in 6:00 o'clock position.)*

o'clock through the 11 o'clock regions of the wound. (In using "clock" designations, 12 o'clock is toward the top of the head, 6 o'clock downwards toward the neck, 3 o'clock toward the front of the head and 9 o'clock toward the back of the head.) There was extensive gray-black material distributed around the edges of the wound with focal black charring along the 3 o'clock edge. A smooth edged laceration with a squared superior margin extended upward from the 12 o'clock region of the wound, measuring 2 cm vertically by 1.5 cm horizontally. No gunpowder tattooing was seen on the surrounding skin after shaving. Fragments of gunpowder were recovered in the temporal muscle underlying the wound. The bone beneath the wound had a semicircular, inwardly bevelled, defect inferiorly, with a more jagged and irregular defect superiorly with areas of minimal external bevelling along the posterior margin. Extensive gray-black discoloration was seen on the outer table of the skull and on the underlying dura mater. Radiating linear fractures extended from the entrance defect superiorly, inferiorly and anteriorly.

The wound track went through the right temporal lobe, the basal ganglia and the left temporal and parietal lobes. The wound path was from right to left, slightly front to back and slightly upwards. The track measured between 5 cm and 7 cm in diameter. Multiple small silver-gray metal fragments were found along the wound path. The wound track terminated in the region of the left parietal skull. A non-perforating circular fracture site with partial external bevelling of the bone was found in this area. Radiating linear fractures extended superiorly and inferiorly from this defect. The scalp overlying this incomplete exit defect was contused, but without laceration or perforation.

The decedent's hands were remarkable for gray-block soot deposition on the dorsum of the left hand involving the thumb, index and second finger and on the ventral surface involving the palm, index and second fingers. Testing confirmed the presence of gunshot primer residue on the hands.

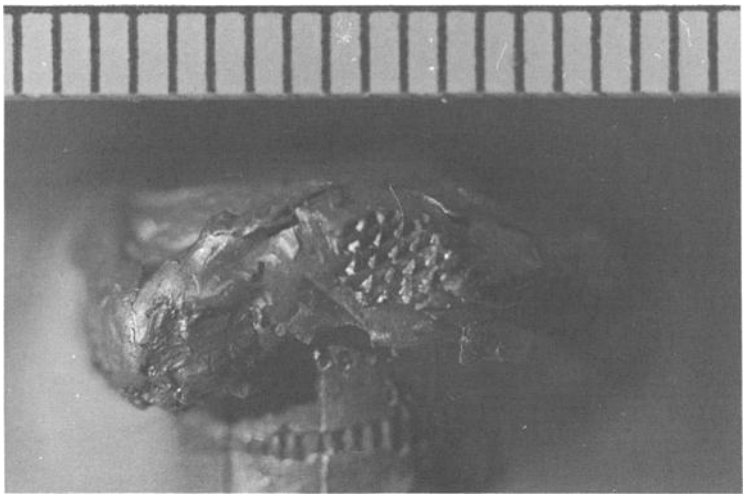

FIG. 2—*Close-up view of projectile recovered at scene with patterned mark on edge of mushroomed tip.*

Examination of the projectile recovered at the scene revealed a mushroomed and deformed unjacketed slug. Along a flattened and scraped appearing area of the rim of the bullet was an area of imprinted cross-hatching measuring 0.2 × 0.25 cm (Fig. 2). This was initially thought to be a mark left by improper handling of the projectile at the scene with a pair of metal tweezers. However, the investigating officer was adamant that the projectile was handled correctly. His claim was supported by the fact that his tweezers had a linear pattern of grooves on the inner surface of its tips that did not match the pattern seen on the bullet.

The suspect weapon was brought in for a more careful examination. This revealed an area of knurling on the end of the cylinder ejection rod with a size and pattern identical to that seen on the bullet (Fig. 3). Closer examination also revealed fragments of silver

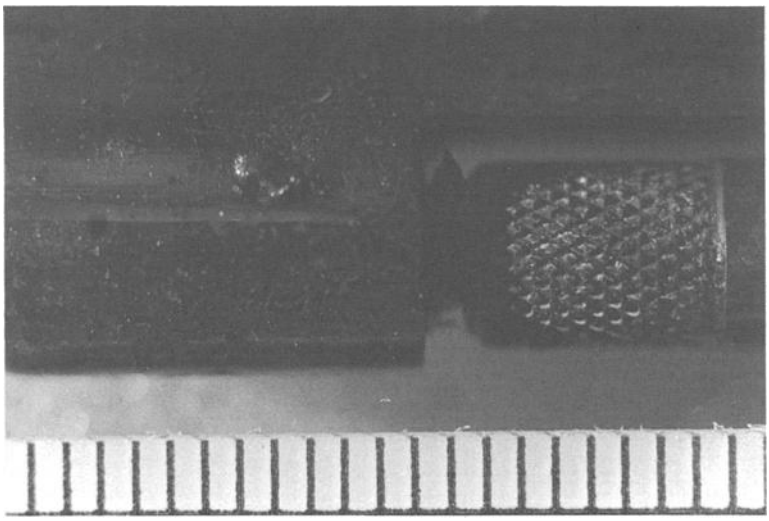

FIG. 3—*Close-up view of cylinder extractor rod with knurling. Note metal fragments impacted in knurling.*

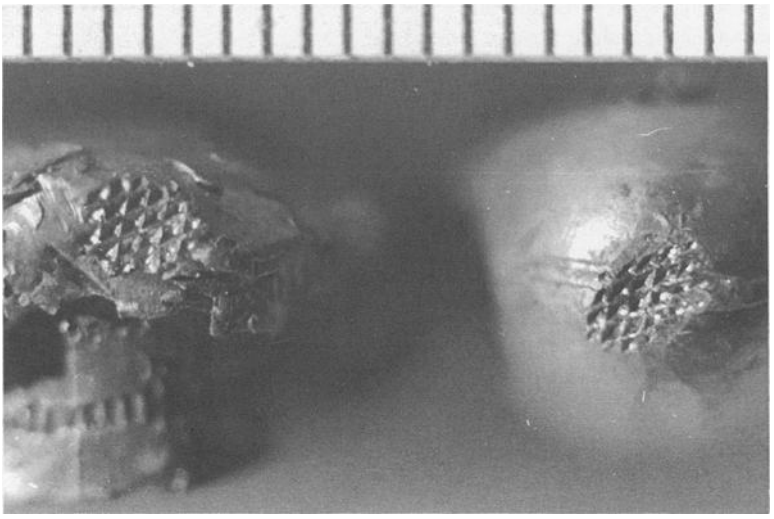

FIG. 4—*Recovered projectile and test slug with knurling patterns.*

gray metal impacted into the knurling along the left side. After photographing the extractor rod, an unfired unjacketed round nose slug was pounded onto the area of knurling. This left an imprint on the bullet identical to that seen on the recovered slug (Fig. 4).

Discussion

Internal ricochet of projectiles in gunshot wounds of the head is a common finding. Approximately two thirds of .38 caliber handgun wounds of the head have a retained missile, with internal ricochet occurring in 10 to 25% of these cases [*1*]. The most common pattern of ricochet seen is one in which the bullet passes through the brain, strikes the inner surface of the skull and then travels along the cortical surface or subcortical tissues following a path parallel to the inner table of the skull. It is less common to see a ricochet where the bullet bounces off the inner surface of the skull at an acute angle or directly back along the wound track. The case presented is an extreme example of this latter type of ricochet.

We were initially skeptical that the bullet had exited through the entrance wound, but could propose no other explanation for the findings. The entrance wound itself was not unique and when first examined did not have any features that would immediately make one think it was a combination entrance and exit wound. The finding of tears radiating from a contact range wound is very common. The laceration extending from the 12:00 o'clock margin of the wound was initially thought to be due to overstretching and blowback effects. There were no features of this area of injury which could be matched to any portion of the barrel of the recovered revolver. The finding of areas of external bevelling of the bone underlying the laceration suggests that the tear was caused by the exiting slug, although external bevelling of calvarial entrance wounds may sometimes be seen. The size and shape of the wound track through the brain, while larger and more irregular than usual [*2*], did not have any features which allowed us to specifically determine that there had been a second pass of the projectile through the brain. Even the most telling piece of evidence, the imprint from the ejector rod on the recovered slug, was first thought to be the result of improper handling at the scene. It was only after closer examination, and the finding of metal fragments lodged in the knurling of the

ejector rod, that we accepted the fact that the exiting bullet must have hit the rod while the weapon was still held up to the head.

References

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Address requests for reprints or additional information to
Todd C. Grey, M.D.
Office of the Medical Examiner
P.O. Box 58739
Salt Lake City, UT 84158-0739