

CASE REPORT

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Evidentiary Value of the Contents of Hollow-Point Bullets

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ABSTRACT: The fortuitous recovery of material trapped within the cavity of a hollow-point bullet at autopsy was demonstrated to be of evidentiary value. Analysis of this material, as well as that from hollow-point bullets from test-firings, showed that the contents, especially if in multiple layers, could be correlated with the series of intermediate targets perforated. In the case presented, this aided investigators in determining how many bullets actually struck the victim. Frequently displaced, especially if distortion of the hollow point has occurred, this tidbit of trace evidence is worth recovering and analyzing.

KEYWORDS: criminalistics, ballistics, trace evidence, wound ballistics

The development of Locards' Transfer Principle, implying that with contact between two objects some material is transferred in both directions, is the fundamental tenet of trace evidence analysis [1-4]. Based as much upon common sense as it is upon our increasing scientific abilities, the concept serves to prevent the most common error of investigative work—omission. As our technological skills advance, it becomes easier to look at the "little things." Use of an operating microscope in the autopsy suite prompted recognition of just how important a role these seemingly inconsequential things may be.

Case Report

A 32-year-old black male was shot to death during an altercation involving several persons gathered in an apartment; 2 other persons were also injured. Statements from the witnesses and surviving victims were markedly conflicting as to total number of shots fired, number of handguns used, who was shot, and when and how many times they were struck. The assailants' statement and weapons were not available at the time of autopsy.

Examination of the body (Fig. 1) revealed six gunshot wounds. Four (A,C,E,F) were characteristic of entrance wounds; two (B,D) were obvious exit wounds. Gunshot Wound C, a grazing entry with laceration tags and an abrasion ring indicating a lateral entrance [5,6],

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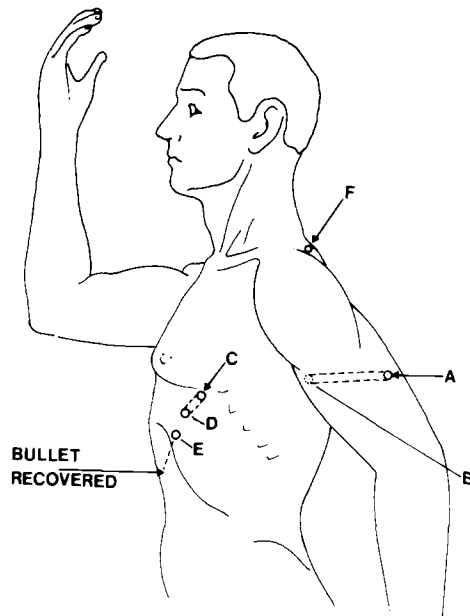


FIG. 1—Chart showing the location and direction of the gunshot wounds. Wounds A through E can be anatomically aligned.

was connected medially to exit Wound D by a subcutaneous tunnel. Wounds D and E were obvious wounds of the kissing type [7]. Additionally, Wounds A, B, C, D, and E could be anatomically aligned by appropriate positioning of the body. Therefore, Wounds A through E might represent a single wound track or injuries from multiple bullets. X-ray revealed two bullets lodged in the body; one was later associated with the wound track of entrance Wound F, the other with a subcutaneous track from entrance Wound E. No information on the recovery of bullets at the scene was available. Before examination, the local police removed the victim's blue T-shirt and grey jogging jacket.

At autopsy, both bullets were 158-grain semijacketed hollow-point bullets 0.357 in. (9 mm) in diameter. While the exposed lead nose of each was distorted, the copper jackets had expanded either very little or not at all. This is consistent with our experience of heavy hollow points from short-barreled .38 special revolvers.

After track dissection, the bullet from Wound E was recovered and a plug of blue fibrous foreign material was noted near the site of lodgement. Its conformation mated perfectly with the residual cavity in the bullet (Fig. 2). Examination of the plug under the operating microscope revealed a multilayered structure consisting of an innermost layer of epidermis followed by a layer of jogging suit, T-shirt, and topped by a layer of epidermis. The bullet from Wound F was recovered from the liver and contained no foreign material either in the hollow point cavity or within the wound track through the left lung and heart.

If a single bullet were responsible for bullet track A to E, it might theoretically have passed through a total of 15 layers of skin and clothing to create the wound track. Examination of the clothing showed defects corresponding to the wounds. Specific note was made whether the clothing defects could be fully closed or if an actual loss of material occurred. The skin wounds were also examined. Exit wounds, by virtue of their splitting nature (in contrast to the impact pressure of skin entrance wounds) would not be expected to leave a layer of epidermis within the bullet hollowpoint [7-9]. The remaining entrance wounds, A and C, however, should be represented in the cavity contents of the hollow-point bullet.

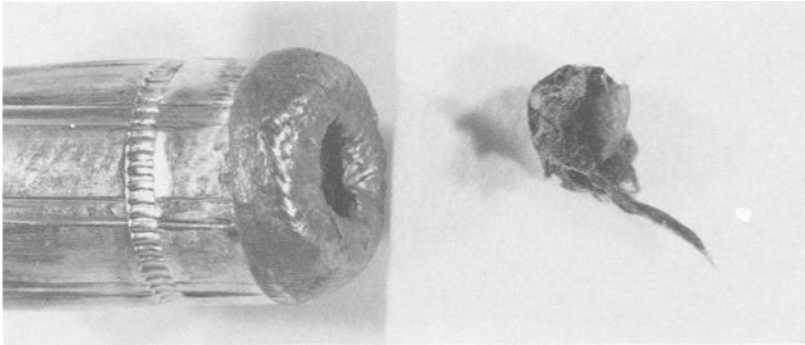


FIG. 2—Photograph of the bullet recovered from the wound track of Wound E, and the plug of foreign material recovered near the site of lodgment.

Table 1 correlates the results of the clothing and body examination and the actual contents of the layered cavity plug. As is shown, the sequence correlating with the actual findings indicates the bullet had indeed passed through the upper arm and was responsible for all the wounds in bullet track A to E.

Reproduction of our findings by use of a model helped confirm our hypothesis. A multi-layered model consisting of paper and cloth stapled together was constructed as in Fig. 3. The paper consisted of variously colored photostatic copy paper, paper toweling, and brown paper sacking. The cloth was a cotton twill used for gunshot residue patterning. A 2-in. (5 cm) airspace was included to see if the cavity contents would be lost in free flight, a condition which may have existed between the victim's upper arm and the chest wall. The model was placed in the front of a cotton-fiber waste stop box and shot through by jacketed hollow-point bullets (at muzzle velocity approximately 850 ft/s (260 m/s).

Recovery of the bullets from the trap showed a firmly embedded plug maintaining the target sequence (Fig. 4a). The paper, reproducing the brittle qualities of epidermis, left cir-

TABLE 1—Correlation of clothing, wounds, expected findings, and examination of the cavity contents.

Sequence	Gunshot Wound	Target	Type of Wound	Expected Contents	Observed Contents
1	A	jacket sleeve	in	...	...
2	A	T-shirt hem	in	...	...
3	A	skin	in	skin	skin
4	B	skin	out	...	...
5	B	T-shirt	out	...	...
6	B	jacket armpit	out	...	...
7	C	jacket armpit	in	jacket	jacket
8	C	jacket pocket	in	...	...
9	C	T-shirt	in	T-shirt	T-shirt
10	C	skin	in	skin	skin
11	D	skin	out	...	...
12	D	T-shirt	out	...	...
13	D	jacket pocket	graze	...	...
14	E	T-shirt	in	...	...
15	E	skin	in	...	...

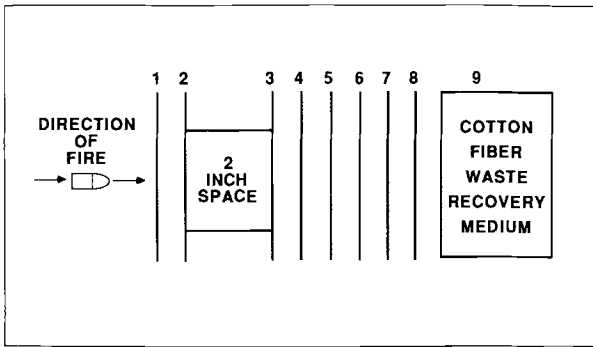


FIG. 3—Diagram representing the model used in the study. 1 = white photocopy paper; 2 = blue photocopy paper; 3 = white cotton jean twill cloth; 4 = yellow photocopy paper; 5 = green photocopy paper; 6 = white paper toweling; 7 = white photocopy paper; 8 = brown paper sacking; and 9 = cotton fiber waste in stop box.

cular remnants in the plug. The cloth shown in Fig. 4b did not tear with the characteristic linear or cruciform splits of round-nose bullets, but rather displayed a tear consistent with incipient circular plug formation, remaining attached at one margin. Although, in this experiment the cloth plug did not become entrapped in the cavity, a trace (one fiber) of its contact was recovered. These results were typical for all the bullets tested in .38 and .45 caliber.

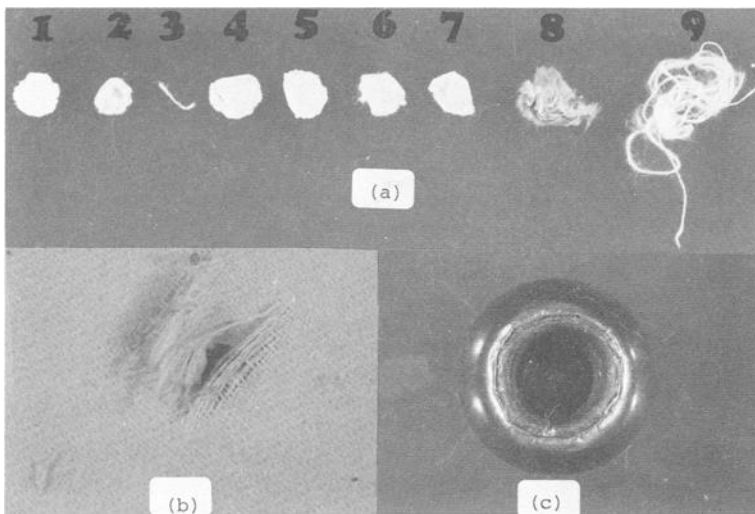


FIG. 4—Results of test-firing through the model. (a) Sequence of layers making up plug recovered from hollow point cavity, from left to right fragments represent deepest to shallowest layers. Numbers above fragments correspond to the numbered layers in the model (Fig. 3). Note that proper sequence is maintained. (b) Close-up of cloth layers showing the incipient plug formation, a circular tear remaining attached at one margin. (c) Bullet used to produce this plug, a Speer .45 caliber, 200-grain jacketed hollow point.

Discussion

Our findings are at variance with previous concepts stating that clothing driven into skin by bullets is usually found in the dermis or subcutaneous tissues near the entrance wound [10,11]. Deep deposition of clothing is usually associated with shrapnel [12] or large objects with flat presenting surfaces [13]. A review of the medical and criminalistics literature revealed a dearth of information regarding hollow-point bullets and intermediate targets. The excellent papers by Stahl et al. [14] and Dixon [15,16] deal with round-nose bullets in which small fragments of brittle materials may superficially contaminate wounds or be embedded in the bullet itself.

We have found marked exceptions to accepted dogma as a result of changes in bullet construction and type of intermediate target. Any bullet with a flat presenting surface—wadcutter, semi-wadcutter, flat nose, and hollow point—may cut a patch from the cloth and carry it wrapped about the nose well into the wound track. We now know that for hollow points, a plug consisting usually of only one layer may show a series of intermediate targets. Moreover, any style bullet passing through lofted fibers (such as an insulated jacket) can pick up a cocoon similar to a ballistic stop box and carry this to the end of the track.

The hollow-point bullet, impacting with its relatively sharp margins acting as a cutting edge, will entrap target materials within the cavity. This case report and our model indicate that the sequence of targets traversed is maintained with the intracavitary contents are recovered.

Recognition of this evidentiary material and taking the time to analyze it carefully was instrumental in clarifying the circumstances of an otherwise confusing case.

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