



Case #83

NAME Educational Activities Committee

Submitted by:

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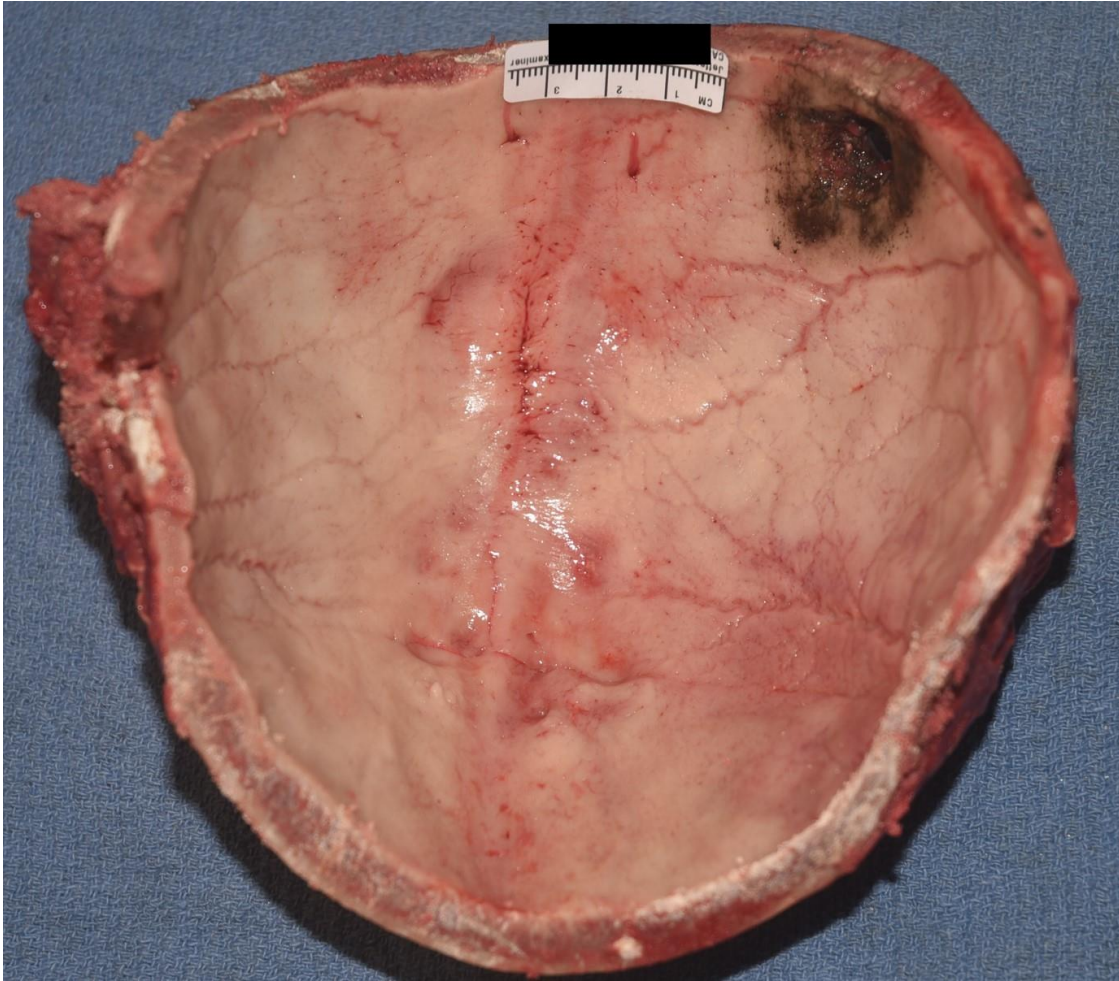


Image 1



Image 2

1. A 52-year-old man is found decomposing in his apartment. The defect of the skull identified at autopsy is best characterized as:

- Tangential entrance wound, intermediate range
- Exit wound, Intermediate range with bullet wipe
- Entrance wound, Indeterminate range with frangible ammunition
- Entrance wound, firm contact range
- Entrance wound, indeterminate range with decompositional change

Answer...

D. Entrance wound, firm contact range (CORRECT answer, 70.67% responses)

Other answers:

A. Tangential entrance wound, intermediate range (2.51% responses)

B. Exit wound, intermediate range with bullet wipe (8.52% responsees)

C. Entrance wound, indeterminate range with frangible ammunition (7.26% responses)

E. Entrance wound, indeterminate range with decompositional change (11.03% responses)

Explanation:

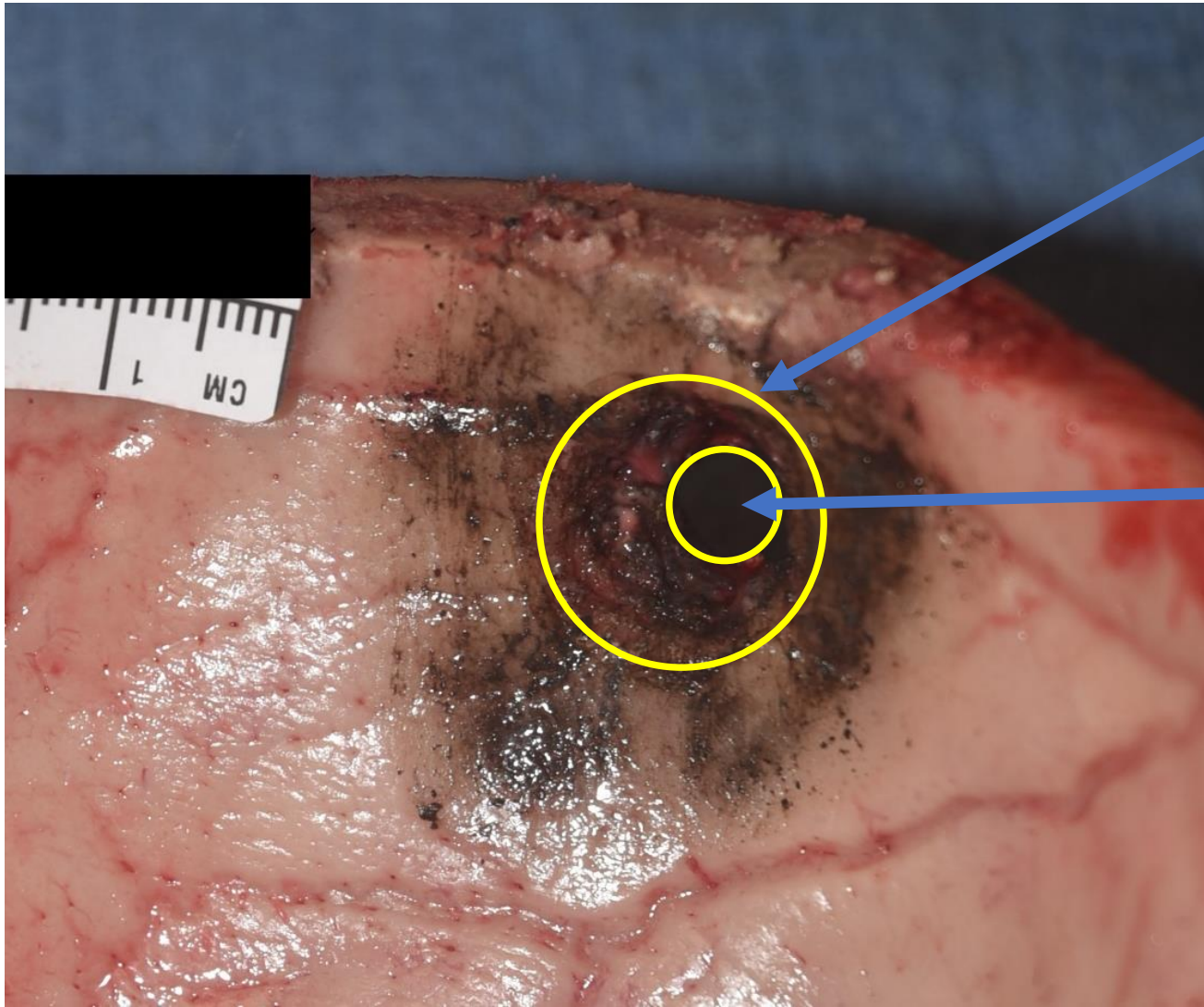
This was a case of a suicidal gunshot wound of the head. The question tests recognition of basic gunshot wound features that provide evidence of directionality and range of fire in the absence of skin findings. There are a few important things to recognize to answer this question correctly:

- 1) Beveling: Beveling refers to the creation of an angled or sloped surface. The sharp edge of a knife is the result of the process of beveling. In a gunshot wound through a somewhat flat bony surface like a cranial bone, the bullet bevels the bone as it passes through. When the bullet passes from outside the head to inside, the beveling is visible from the inner table of the skull (as observed in this case). If the bullet were passing from inside to outside, the beveling would tend to be visible on the outer table. Observed in cross-section, the gunshot wound has a “V” or cone-shape, with the wide (beveled) part of the cone representing the exit. In this case, inner table beveling is readily apparent, thus indicating the bullet is traveling from outside the bone to inside the bone, making this an entrance defect.

Another notable feature of this wound is its shape. The shape is fairly circular, which would suggest that the bullet passed into the head at a relatively perpendicular angle to the bone. If the bullet were traveling more tangentially through the bone, the defect would tend to be irregularly-shaped or even in the shape of a keyhole (the so-called keyhole defect), which is a unique type of wound that is partially beveled. For these reasons, the first two answer choices are incorrect.

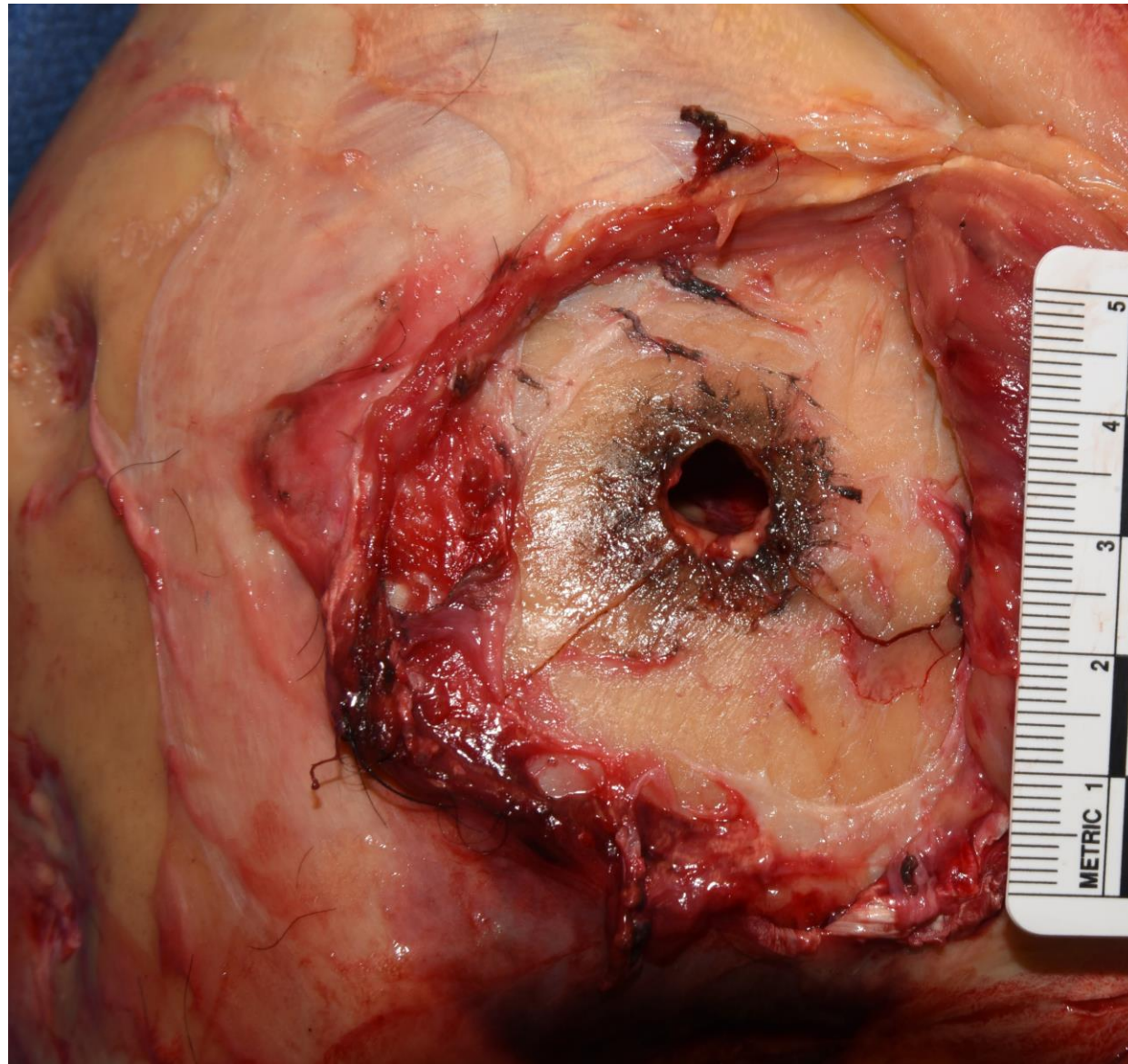
2) Soot deposition: The other helpful thing to recognize in this picture is soot deposition. Soot deposition occurs when a gun is fired at close range from its target (within inches). The nature of soot deposition is dependent upon gun type and ammunition, but for many handguns soot deposition can occur anywhere from contact range to several inches away. The fact that soot is prominent on the inner table of the skull in this picture would suggest a firm contact range of fire. In other words, the gun was held firmly against the head and abundant soot pushed its way through the bone. Bullet wipe refers to material that is deposited on a surface directly from the bullet, often debris that it carries from the barrel of the gun. It can easily be mistaken for soot on clothing and wouldn't be as prominent as the material seen in this picture. Soot deposition can occasionally be difficult to distinguish from decomposition changes, especially on skin, but the location, color, distribution, and granularity easily distinguishes it from decomposition in this case. Frangible ammunition is a type of ammunition that breaks into small pieces upon impact, as opposed to traditional bullets that may just deform or expand. One subtype of frangible ammunition to be aware of are Radically Invasive Projectiles (RIP), which have a fairly characteristic appearance on imaging. The presence and pattern of soot in this case eliminates the need to call this an "indeterminate" range gunshot wound.

Thus, the best answer in this case is "entrance wound, firm contact range." The beveling indicates this is an entrance gunshot wound. Soot deposition can be observed on and under the skin in contact or close-range gunshot wounds, but the distribution and abundance of soot in this case makes entrance, contact range the best option.



Bevel margin, inner table

Defect of the outer table, observed from the inner table



Example of outer table of the skull (muscle reflected) in a contact gunshot wound of the head. Soot deposition is observed, but there is no beveling.

References

Di Maio V. Chapter 4: An Introduction to the Classification of Gunshot Wounds, *Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques*, 2nd Edition. CRC Press, 1999.