




Case Study

One Awe-Inspiring Projectile

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One Awe-Inspiring Projectile

Forensic nurse examiners (FNE) and medical professionals may encounter patients who have sustained a gunshot wound – which may be either self-inflicted or inflicted by another. An essential assessment outcome is ensuring proper interpretation of the wound(s), obtaining forensic photography of the physical presentation before and after medical intervention, and cleaning the injury. Additionally, the FNE ensures appropriate collection and handling of valuable forensic evidence, including patient clothing and the retained projectile, while simultaneously maintaining the chain of custody. Ultimately, the FNE will document their findings within the medical record to ensure no erroneous identifications of the entrance and exit wounds which could cause profound issues in subsequent legal proceedings.

Gunshot wounds provide a wealth of information by focusing on patterns, range of fire, and trajectory. Gunshot wounds are either *penetrating*, where there is one single entrance wound and no exit, or *perforating*, where there is both an entrance and an exit wound. Beyond the entrance and potential exit wound, many other physical characteristics may be present during the evaluation. Rather than the size of the wounds, other physical characteristics will aid in differentiating between the entrance and exit wounds.

Entrance wounds have six physical findings that may be present:

1. The **abrasion collar** is caused by the projectile entering the skin. An abrasion collar may be circular in fashion; however, if the projectile travels and enters the body at an angle, this will result in an angled or comet-tail abrasion collar because the bottom side of the

projectile has more contact with the skin. This abrasion collar can provide information about the trajectory and the direction the projectile was traveling through the body.

2. Another physical finding is **tattooing** or **stippling** which can be caused by unburned gunpowder.
3. If the gunpowder is burned, the carbon abrasion residue, called **soot**, may be present on the skin, which may be wiped away. Soot can make direct visualization of the abrasion collar difficult for the examiner. The recommended practice would be to initially photograph the injury as it appears, then wipe away the soot to visualize the abrasion collar and obtain additional photographs. Soot will only be present in those gunshot wounds within close range of fire.
4. The skin may be **seared** from the flame emitted from the barrel of the gun, or
5. **triangular shaped tears** may form from the gas injected into the skin, causing the skin to expand to a point where it rips and tears.
6. Lastly, in some instances, there may be a **muzzle contusion** resulting from the injected gas pushing the skin against the barrel of the gun itself.

Exit wounds may also have irregular borders, even though there may be an absence of soot and seared skin; specifically, there is a possibility of having no tattooing or stippling apparent but still presenting with triangular shaped tears.

Range of fire is the distance from the gun to the impacted anatomical location on the body. The range of fire will also present physical characteristics at the wound location. Contact with the skin, even through layers of clothing, will result in an abrasion collar, seared skin, triangular shaped tears, and the presence of soot. **Close contact**, which is designated as zero to six inches, will result in the presence of an abrasion collar and the presence of soot.

Intermediate range of fire, which is up to 48 inches, will present with an abrasion collar and tattooing or stippling. **Distant**, or **indeterminate range** of fire, is greater than 48-inches and the singular physical finding will be that of an abrasion collar.

Implications for Practice

When the forensic examiner assesses an individual who has sustained a gunshot wound, the examiner notes the entrance and exit wound characteristics, identifies the range of fire based on the physical characteristics noted, and then identifies the projectile's trajectory. The trajectory is the path the projectile takes into and through the body to its resting place, either inside the body or through an exit wound. The travel pathway of the projectile is documented as superior to inferior, medial to lateral, and anterior to posterior in relation to the entrance and exit wound.

When evaluating an individual who has sustained a gunshot wound, there are some essential questions to ask:

- What happened?
- Was the individual facing toward or away from the gun?
- Who shot them?
- If you are familiar with types of guns, what type of gun was used?
- How many shots were heard?
- Does the individual know why they were shot?

- Does the individual with the gunshot wound own a firearm?
- How far away from the gun were they?

An Unusual Case Study

Not every day does a forensic examiner encounter the opportunity to evaluate an individual with two bullet entrance wounds and two exit wounds. The following case will showcase the physical presentation of a self-sustained gunshot wound.

Case Study

A man in his 20s presented to the emergency department after a gunshot wound. He described placing the firearm into the front right pocket of his jeans. The gun discharged, and the projectile traveled superior to inferior and from lateral to medial through his right testicle and exited through his left testicle. In this case, there was contact with clothing, as the firearm was located within the front pocket. Gases were injected into the pelvic area where the barrel was located. Gases were injected into the pelvic area where the barrel was located. The ejected gases were caught between the pocket liner and the underlying skin. As such, not all the gases went into the wound, but on the skin's surface, the presentation of seared skin, soot, and triangular-shaped tears was visualized. The pocket liner expanded, and the flame and the projectile contacted the skin, resulting in additional injury.

The following pictures depict the wound presentations identified during the medical forensic evaluation. Figure 1 shows the entrance wound at the base of the right testicle, at the ten o'clock position. Notice the soot and seared skin that is present. Close examination shows there are triangular shaped tears present as well.

Figure 1.

Entrance Wound



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The projectile traveled through the testicular region and exited the left testicle at the four o'clock position (Figure 2). Note the absence of seared skin and soot; there is no stippling present, and there are some definitive triangular shaped tears visualized on the superior portion of the wound.

Figure 2.
Exit Wound



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Inside the right-front pocket liner, bullet wipe and fiber defects were visualized. Bullet wipe residue transfer is caused when the projectile passes through the pocket liner. The bullet wipe forms when the carbon residue in the barrel is transferred onto the projectile as it travels downward, which is then deposited on the pocket liner. The bullet, a soft-nosed lead without a jacket present, travels down the barrel and results in the lead wiping off onto the clothing as the projectile travels through it before penetrating the skin.

Primer residue was visualized; when the projectile is discharged, a puff of residue from the primer is expelled from the barrel and then deposited on the pocket liner. There is also an absence of projectile lubricant, an oil that may be deposited onto the projectile while it is either in the magazine or the chamber. When the projectile is discharged, the lubricant travels down the barrel and makes contact with the right pocket liner.

Interestingly, the projectile then re-entered through a comet tail abrasion collar (Figure 3), traveled inferiorly down the inner aspect of the medial aspect of the left thigh, and then exited. The projectile was later to have been located and retrieved at the residence.

Figure 3.
Left Thigh



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Outcome

Because of the anatomical location of the injuries, the gunshot wound victim was subsequently transported after stabilization for additional evaluation and treatment in a trauma center under the care of a urologist.