

## Case Report

### Reconstruction of a Shotgun Injury: A Case Review

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#### Abstract

Every firearm case is unique in the sense that the behavior of the missile from the movement it leaves the gun barrel till it ends its journey. According to the internal ballistics interpretation of which is the task before carrying post-mortem examination, of every firearm injury is very interesting and specific to the case. This is so because of innumerable variables affecting the entire process. Crime scene reconstruction is the process of determining or eliminating the events and actions that occurred at the crime scene through analysis of the crime scene pattern, the location and position of the physical evidence including deceased body and the autopsy findings and laboratory examination of the physical evidence. Here with we are reviewing case of muzzle loading shotgun injury resulting in death in which investigating officer has suspicion about death as deceased sustained multiple firearm injuries.

This case highlights the importance of posture of the victim interpreting the resultant injuries and recreating the scene of occurrence. A meticulous autopsy, examination of weapon and reconstruction of scene of crime in order to elucidate the manner of death are of great importance in firearm cases.

**Key Words:** Muzzle loading shot gun; Reconstruction of scene of crime; Autopsy

#### Introduction:

Gunshot injuries occur when someone is shot by a bullet or other sort of projectile from a firearm. Peace time gunshot injuries occur in a variety of different situations: criminal and terrorist incidents (including shots fired by law enforcement agents), attempted suicides as well as unintended firearm 'accidents' (both civilian and amongst the armed forces). [1]

Only few percent of firearms-related deaths each year are caused by accidental shootings. Unintentional firearm injuries constitute a small but significant fraction of all firearm injuries in developing countries. Contrary to what many people believe, having a gun in your home doesn't make you safer but instead endangers you and your loved ones.

A gun in the home makes the likelihood of homicide three times higher, [2] suicide three to five times higher, [3, 4] and accidental death four times higher. [5]

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The majority of deaths from firearms are suicides or homicides. It should be noted that Guns contribute only a small proportion of accidental deaths in our country compare to other accidental deaths like road traffic accident, asphyxia, poisons etc. The direction of firing may become a point of great medico legal interest towards determining the relative position of the victim at the material movement. So during autopsy of firearm cases complete and careful examination of entry and exit wounds plays the major importance.

In this paper the importance of reconstruction of scene of crime including autopsy, when dealing with the firearm death is emphasized.

#### Case Report:

Deceased 45 years old male was brought to our mortuary with history of shot gun injuries. Weapon of offence is muzzle loading gun was also brought by the police for examination. (Fig. 1) At scene of crime body was lying on floor with dismantled muzzle loading shot gun beside dead body.

Investigating officer had suspicion about cause of death as deceased sustained multiple shotgun injuries over lower half of body. Before autopsy whole body X ray was taken. X ray showed few pellets (bicycle ball bearing) in the left hand, left leg and left thigh and a lead shot with multiple pellets in pelvic cavity.

### **Autopsy Findings:**

On external examination, two lacerated slap wounds (Fig.1) were noted one over dorsum of left thumb of size 3cm X 1.5cm X Tendon deep and another over front of left leg at its middle one third of size 5cm X 4cm X Muscle deep. Both slap wounds were surrounded by scorching of skin, singeing of hairs, blackening and tattooing. Oval shape entry wound of size 2.5cm X 1.5cm was present over inner aspect of left thigh and surrounding skin showed scorching, singeing of hairs blackening and tattooing. Multiple exit wounds of few pellets noted over left inguinal region. (Fig. 1) Lead shot over sacral region could be palpable.

On internal examination peritoneal cavity filled with blood, iliac vessels lacerated, coils of ilium at pelvic cavity were lacerated and S-3 vertebra fractured and lead shot (slug) was lodged below skin at sacral area. Other organs were pale and unremarkable. Bicycle ball bearings used as pellets were found around pelvic cavity. Coconut coir used as wad found at exit wound at left inguinal area.

The track of the entry wound was slap wound over left thumb and left leg, entry wound over inner aspect of thigh, runs upwards towards left groin, lacerating femoral and iliac vessels, coils of intestines, fracturing of S-3 vertebra, lead shot lodged subcutaneously over sacral area. (Fig. 2) Whole track was lacerated and hemorrhagic. After autopsy weapon involved in the act was examined. It is old single barrel muzzle loading shotgun in which barrel was separated from breech of shotgun.

Rod used for loading gun powder, lead shots and wad (coconut coir) was also examined. Before conducting autopsy clothes and multiple swabs from both hands were collected for ballistic examination. Coir and pellets recovered from body were also preserved for ballistic examination.

### **Discussion:**

A firearm is an instrument or device, which forcefully ejects out a projectile through its muzzle because of expansive force of gases generated by combustion of explosive gunpowder particles. Firearms can broadly divided into rifles which discharge bullets and smooth bored or shotgun which discharge pellets. [6] A shotgun consists of one or more metal barrels of relatively wide diameter, which are smooth on the inner surface.

The ammunition for the shotgun is a cartridge made of a cardboard or plastic cylinder fitted into a metal base. They fire a variable number of spherical lead shot (pellets), which

emerge from the end (muzzle), from where they gradually diverge in the form of a long, narrow cone. Sometimes, a shotgun may fire a few large projectiles or even a single slug, but these are rarely met with in forensic practice, the usual load of pellets totaling scores of hundreds. [7]

Wound ballistics is study of the injuries produced in the body by the firearms. For a medico legal expert, an elementary knowledge of structure of firearms and ammunitions, together with an idea about the mechanism of discharge of projectiles, will be essential for proper understanding and interpretation of injuries caused by firearms. [6]

Self-inflicted gunshot wounds show a male predominance, although women are frequent victims in some jurisdictions. [8]

In most cases, the deaths occur at home or its vicinity. [9] In cases of accidental firearm injuries, often the door is not secured from the inside (e.g., locked, wedged by chair), and finding a firearm, particularly in proximity to the deceased, is supportive of accidental with any unusual circumstance. Sometimes the suicide victim may attempt to create a "gun cleaning" or "hunting" accident. [10]

Careful investigation is needed to determine whether discharge of a gun under these circumstances was an accidental death. Suspicions are aroused when handguns are involved in a hunting incident. [11]

There are various reasons why multiple shots are fired in a suicide or accident lacking anatomical knowledge, the victim misses vital organs; the victim's hand flinches when the trigger is pulled; defective, improper, or low-velocity ammunition is used and penetrates the body (e.g., skull) superficially; and certain types of weapons are used. [10, 12-14]

Certain features on the hands support the circumstances of accidents, particularly in multiple shot cases. [15] In such cases some of the investigation to be carries out like:

- 1) The hands need to be covered by paper bags to protect evidence, particularly if there are suspicions surrounding the death [10]
- 2) Fingerprinting and hand washing, as part of body preparation prior to the pathologist's examination must not be done
- 3) Primer residues, not visible to the naked eye, are deposited on the hands that should be collected. [10, 16]
- 4) Jeopardize the documentation and collection of evidence. [10, 17]

Blood and/or tissue (e.g., brain matter, if a head wound) owing to blowback ("backspatter") may be found on the dorsum of the hand that fired a pistol/revolver (firing hand)

and the hand that steadied the muzzle (non-firing hand). [10, 13, 17]

If the non-firing hand is used to steady the end of the muzzle of the handgun, rifle, or shotgun, and the muzzle is not tightly opposed to the skin, then soot can be deposited on the thenar aspect of the palm, i.e., the index finger and thumb ("muzzle gap effect"). [10, 15]

Postmortem radiography is an essential component of firearm injury examination. Antero posterior and lateral radiographs assist in determining the location, nature, and path of projectiles in the body. [21]

Lateral radiographs are particularly helpful if there is an anterior torso entry and the bullet does not exit from the back. Reliance on only antero-posterior radiograph leads to a mistaken assumption that a bullet is deep within the body, resulting in a time-consuming search.

The posterior location of the projectile, indicated on the lateral radiograph, means that simply palpating and incising the skin on the back allows easy recovery. More sophisticated radiological techniques (MRI, CT) may play a role in the assessment of firearm injuries. [18]

The direction of the wound track in relation to the deceased must be documented. The trajectory can favor self-infliction. [19]

Unusual trajectories require reconstruction based on different body positions. [20] Apparent hunting accidents, masking suicides, have contact wounds. After every case of firearm injuries, examination of firearm plays a major role. Firearms need to be examined by other experts for evidence of misfiring. [21]

There may be a need to reconcile an apparent discrepancy among the autopsy, scene findings, and circumstances of the death. [22]

Fingerprints of the deceased may be seen on the cartridge or firearm. [23, 24] In one study, fingerprints were found on the gun in 12% of cases. [25] On perusal of crime scene report, examination of weapon, postmortem and ballistic report following conclusion was drawn.

In our case deceased was found inside the house and he has not secured or bolted his door. Weapon of offence was found beside body which was dismantled. No history of depression or suicidal note.

The range of firing was close range. Single round of shot was fired. Track of entry and exit wound gave the idea about posture of victim during incident. Deceased was sitting on floor with flexing his left leg at knee, holding the muzzle end with left hand loading his old muzzle loading gun using the rod with right hand, when shot gun accidentally got fired.

The cause for accidental firing may be the friction in barrel by rod while loading gun powder and pellets which ignited the gun powder, since loading of barrel is very sensitive technique. Homicide and suicidal motive was ruled out. All the above findings concluded that it was an unintentional or accidental firearm injury. A vigilant crime scene investigation, meticulous autopsy, recreation of scene of crime and circumstances of death in order to elucidate the manner of death are of great importance in such cases.

### Conclusion:

The distinction between homicide, suicide and accident is a complex and central issue in Forensic Medicine.

Detailed examination of the crime scene, careful and complete autopsy of the deceased person, anamnesis, collaboration and information exchange among investigators and Forensic specialists will help for the correct interpretation of these interesting cases.

Every firearm cases are unique in the sense that the behavior of the missile and the injury produced by it. This firearm injury resulting in death highlights the importance of posture of the victim.

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**Fig. 1 a: Entry Wound Over Left Thumb**



**Fig. 1b: Entry Wound over Left Leg**



**Fig. 1c: Entry Wound Over Left Thigh**



**Fig. 1d: Few Exit Pellets Wound at Left Groin**



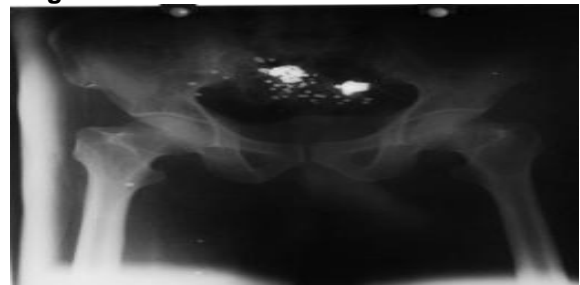
**Fig. 2a: Track of Entry Wound**



**Fig. 2b: Dismantled Muzzle Lading Shotgun**



**Fig. 2c: Pellets in Pelvic Cavity and Left Thigh Area**



**Fig. 2d: Pellets in Left Thumb Area**

