



Case Report

An unusual exit wound as a result of a shotgun suicide to the head



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ABSTRACT

The location of a gunshot entrance wound as well as the wound path trajectory are the main findings that help to determine the position from which a weapon was fired and thus distinguish firearm suicides from homicides and accidents. We present a case of a 28-year old man, who was found dead in his car. Because of an unusual position of the firearm, which was clamped into the steering wheel, and an unclear entrance/exit wound, an autopsy was performed.

The deceased showed typical signs of a contact shotgun wound to the head with an entrance wound in the right temporal region and an exit wound in the midface. With the help of gunpowder attachments and a muzzle imprint at the entrance site, a wound channel from the right lower posterior part of the temporal region to the left anterior part of the mid-facial region could be reconstructed. The stellate wound in the midface was assessed as an atypical exit wound.

The cause of death was a contact shotgun shot to the right temple with a consequent central regulatory failure due to extensive brain injury. The manner of death was concluded to be a suicide.

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The assessment of fatal gunshot wounds to the head is a common task for the forensic pathologist. The identification and interpretation of typical and sometimes unusual pathomorphological findings at the entrance and exit wound as well the wound path trajectory play an important part in reconstructing the position of the shooting hand and the firearm [1]. In most cases characteristic autopsy features reveal typical skin lacerations that can be defined as a gunshot entrance or exit wound [2]. Due to the high velocity of the projectile, its rotational spin and thus its interaction with the highly elastic skin, the entrance wound has a centered substance defect with a diameter approximately matching the penetrating projectile. Its margins are covered with a ring of dirt, which was rubbed off from the projectile onto the skin during the penetrating process. In the immediate surrounding an abrasion ring can be detected. This finding is a loss of superficial skin layer and epidermis as a result of the transmitted energy into the skin and the underlying soft tissue. In addition, the temporary overstretching of the skin causes an additional reddish-bluish circular bruising around the entrance wound, the so-called contusion zone. The exit wound, on the other hand, can be quite variable. It is mainly characterized by the absence of these typical

entrance wound morphologies. Its margins are adaptable and frequently irregularly shaped (Table 1).

The anatomical site of an entrance and exit wound [3] as well as the shooting distance are important details that help to determine the manner in which a weapon was used [4]. Gunpowder residues and specific bloodstain pattern such as backspatter are additional important parts of a crime scene reconstruction [5,6]. The actual extent of a shotgun injury correlates with the interdependency between the pellets, their spread, the tissue and in case of close-range shots also with the gas pressure. Depending on the nature of the bullet (its caliber, mass, velocity, shape, material, construction, etc.) and the target (its density, elasticity, viscosity, etc.) different degrees of soft tissue damages occur in the affected body region [7]. In this context, however, it should be pointed out that in contrast to long-range shots, close-range shots cause more intense injuries, which could make a differentiation between an entrance and exit wound quite difficult. Due to a number of mostly unknown variables such as shooting angle and distance, as well as the position of the shooting hand and the firearm, a broad experience is needed when examining such events.

The same applies to blast wave injuries, which sometimes could mimic a gunshot wound pattern [8].

In addition to the morphological findings, a detailed physiological [9] and psychological [10] background analysis of the victim

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Table 1
Morphological characteristics of a shotgun entrance and exit wound.

	Skin laceration	Wound margin	Immediate wound surrounding	Further wound surrounding	Skull
Entrance wound	Central tissue defect	Bullet wipe mark	Abrasion ring	Contusion ring	Cone-shaped outward beveling in the shooting direction
Exit wound	Wound edges can be approximated	Irregular, torn, slit-like	No abrasion ring	No contusion ring	

can assist to distinguish between a suicide, an accident or a homicide.

In the present case, a shotgun wound to the head caused an unusual laceration wound in the midface and a circular skin defect in the right temporal region. On scene it was not possible for the physician to clearly differentiate the entrance from the exit wound, which is why he declared an unknown manner of death. In consequence, the district attorney ordered a forensic autopsy.

1. Case background

A 28-year old man was reported missing by his mother. He had a medical history of depression, for which he took antidepressant drugs. According to his mother, her son was right-handed. Four months ago he had tried to commit suicide with a knife, but had been caught in time. Eventually the man was found sitting in the driver's seat of his car, which was parked in an uninhabited territory. A shotgun was positioned between his legs and at the same time firmly fixed in the steering wheel of the vehicle (Figs. 1 and 2). Brain tissue mixed with blood and some lead pellets were found on the center console of the car. Bloody soft tissue was widely spread over the ceiling. Suicide notes were found in the car, addressed to his wife and child.

2. Weapon

The weapon used was a Russian Baikal double-barrel over-under 12-gauge shotgun with a 71 cm (28 inch) long barrel (Fig. 3a). The shotgun was in the lawful possession of the father of the deceased and it was apparent that his gun cabinet had been broken into with a crow bar and the weapon had been stolen. A few uncharacteristic bloodstains could be detected at the end of the barrel, however no clear backspatter was identifiable. On examination of its inside, atypical soft tissue particles were found. An angle of incidence could not be calculated. No bloodstains were seen in the lower parts of the weapon.



Fig. 1. Final position, in which the deceased was found.



Fig. 2. Position of the shotgun at the crime scene.

Upon opening the barrel two shotgun 12/70 cartridges of the company "Lyalvale Express" had been placed in both barrels, of which the lower cartridge had been fired (Fig. 3b). The ammunition contain lead pellets with a weight of 36 g.



Fig. 3. (a) Weapon, which was found in the car next to the body. (b) Cartridge, which was found in the weapon.

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