

CASE REPORT

Bernd Karger · Alfred DuChesne

Suicide with a signal pen gun

Received: 7 January 1995 / Accepted: 2 March 1995

Abstract A man committed suicide with a modified signal pen gun and a .22 lr HV HP bullet. The contact shot to the left chest led to a conventional entrance wound. The projectile from the unconventional weapon caused a penetrating wound and was not deformed instead of the expected perforation and deformation. The smooth-bore barrel did not leave characteristic firing marks on the bullet.

Key words Pen gun · Suicide · Wound ballistics

Introduction

Pen guns are used to fire tear gas or to give a signal. Many pen guns are designed to resemble ballpoint pens, pencils, air gauges, pocket knives, lighters or other devices. Generally, inside the pen there is a metallic cylinder of variable length and diameter housing a spring-loaded metal rod. When released, the tip of the metal rod acts as a firing pin (Fig. 1). The open end of the cylinder is threaded. An interchangeable cup-shaped threaded signal or tear gas cartridge is fixed to this end. Alternatively, an additional threaded cylinder serves as a chamber or barrel in which tear gas cartridges can be inserted and fired [3, 8]. For the purpose of firing pistol, revolver or rifle cartridges of calibers up to .45, all that is needed is an additional threaded cylinder serving as a short auxiliary barrel. Although rifled barrels do exist [9], most are smooth bore. Another way to convert a pen gun into a "sharp" weapon is to reload the original interchangeable cartridge by means of a primer, pistol powder, pellets and closing cardboard wads [2].

In World War II pen guns capable of firing conventional bullets were dropped behind the German lines in

Yugoslavia [8]. A considerable number of deaths due to projectiles from pen guns [2, 9, 10] have occurred in the USA, where tear gas pen guns, some able to fire conventional bullets even without further modifications, were sold without restriction [6, 9]. From Germany/Central Europe only one fatal [7] and one nonfatal [4] accident with a pen gun have been reported. Koops et al. [5] investigated 838 fatal gunshots in Hamburg and did not list pen guns.

The intention of this report is to demonstrate the fatal potential of a rare and relatively harmless device and to

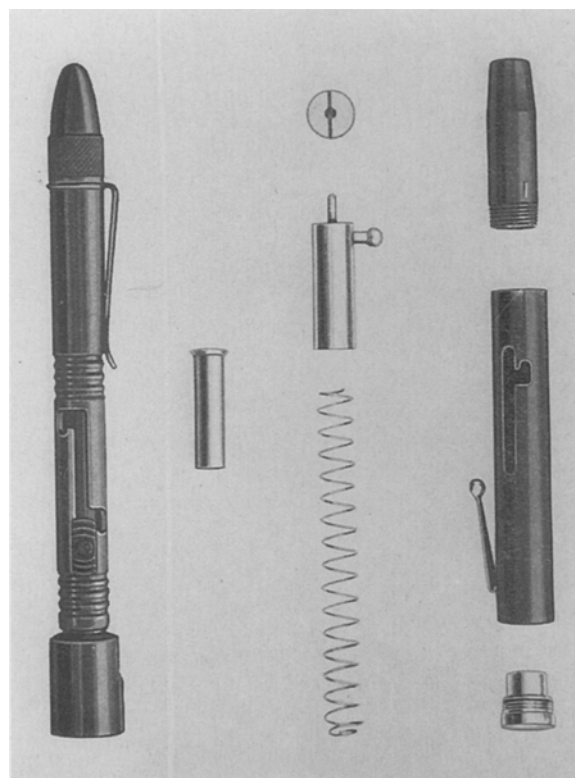


Fig. 1 The parts of a signal pen gun produced by Wischo with the casing, the spring and the metal rod. The tip of the metal rod acts as a firing pin. Firing is achieved by releasing the knob

B. Karger (✉) · A. DuChesne
Institut für Rechtsmedizin
Westfälische-Wilhelms-Universität Münster
Von-Esmarch-Strasse 86
D-48149 Münster, Germany

describe some ballistic peculiarities of bullets fired from pen guns.

Case report

A 32-year-old man was found dead lying on his back by the roadside. To the left side of the body there was a signal pen gun (Wischo Germany PTB 170), modified by adding a threaded, smoothbore barrel of 6 cm length (Fig. 2). The chamber of the pen gun contained an empty 0.22 lr HV cartridge with a single lateral firing pin impression. The man had committed suicide while talking to his former girlfriend using a mobile telephone which was found close to the corpse.

Postmortem findings

The bullet had entered the skin of the chest 6 cm medial to the left nipple, leaving an entrance wound of 4 mm in diameter surrounded by a contusion zone and a thin band of soot deposit (Fig. 3). Blood-spatter was located at the radial back of the left hand and soot deposit at the left radial index finger. The wound tract passed through

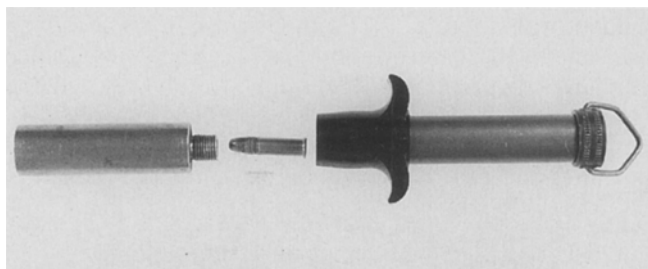


Fig. 2 The signal pen gun used in the case reported. There is the pen gun, an unfired cartridge and the additional threaded cylinder serving as a barrel. Firing is achieved by pressing the base of the pen gun

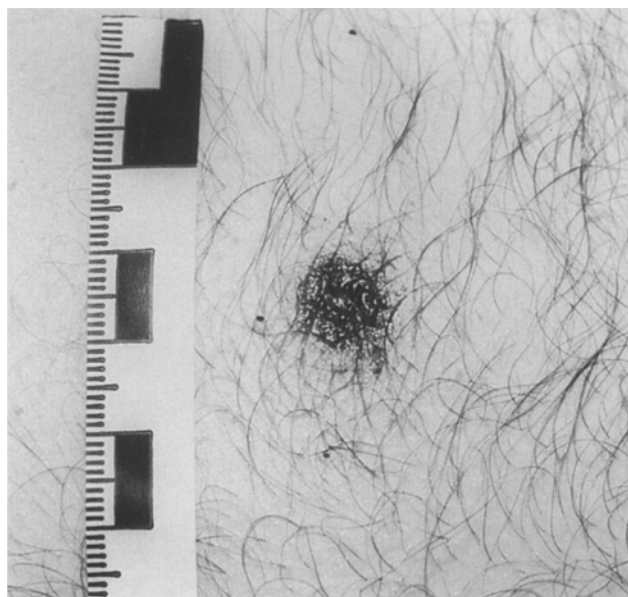


Fig. 3 The entrance wound showing typical signs of a contact shot. The use of an unconventional firearm cannot be suspected from the exterior aspect

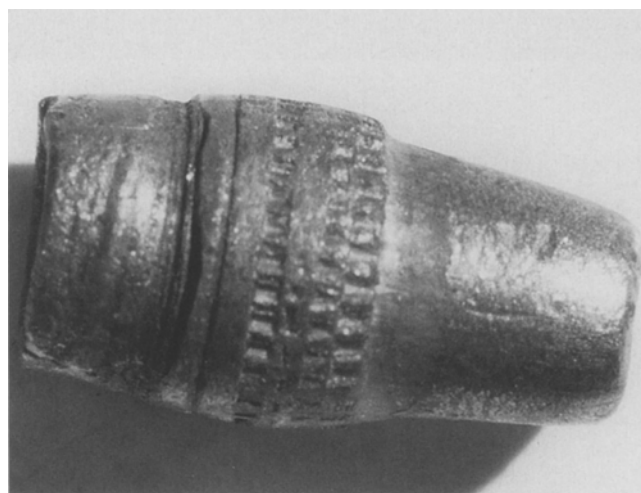


Fig. 4 The recovered .22 long rifle high velocity hollow point bullet, a lead bullet with a very thin copper layer clearly not functioning as a jacket. No rifling marks or deformation at the tip can be seen. Instead, the base of the bullet is slightly compressed due to the oversized barrel caliber. The sides show only irregular marks from contact with the inner walls of the smooth barrel

the third intercostal space, through both lobes of the left lung close to the hilus with lacerations of branches of the Arteria pulmonalis and bronchi and through the seventh intercostal space at the back. A nondeformed hollow point bullet 0.22 lr (Fig. 4) with its long axis perpendicular to the wound tract was found in the musculature directly below the scapula. The wound tract was 19 cm long and up to 1 cm wide. Multiple blood aspiration foci in both lungs, hematothorax at the left side (approx. 3 l of blood), swallowed blood in the stomach, general anemia. The cause of death was massive bleeding and/or blood aspiration. According to the bloodspatter and the soot deposit at the left hand, the shot was fired with the left hand by grasping the lateral “wings” of the pen gun with the index- and middlefinger and by operating the trigger at the base of the pen gun with the thumb.

Histologically, there was a disseminated swelling of the muscle fibers of the myocard. In the areas surrounding blood aspiration foci of the lung tissue, an incipient leucocyte migration through small arteries could be seen. Both findings would indicate a survival time of more than 15 min up to 1 hour.

Discussion

The forensic significance of pen guns is obvious. Primarily designed as a cheap and easily carried device for the purpose of self-defense or giving a signal, pen guns can be converted to “sharp” weapons by rather simple means, as described above. Because they are so easy to conceal, they can also be used as malicious weapons.

In spite of the short barrel, the lack of rifling and the loose fit of the cartridge and bullet, resulting in lower velocities when compared to conventional handguns, the lethal potential of “sharp” pen guns is unequivocal, both theoretically [3] and empirically [2, 7, 9, 10]. But there is also a potential hazard for the operator of a pen gun. Some of the cylinder barrels and reloaded cartridges have been reported to break or even explode when being test-fired [2, 3]. Accidental deaths due to dropping the pen gun on the ground with subsequent discharge of the round have

been described [7, 9]. In a very bizarre case, a man fired a .45 ACP round from a tear gas pen gun [6]. Because of the minimal weight of the pen gun, a tremendous recoil originated from the discharge, propelling the weapon itself backward, out of the operator's hand, through his right eye and penetrating 10 cm into the brain.

Firing regular pistol or revolver ammunition from caliber .22 through caliber .44 magnum from pen-guns, Jones et al. [3] found a very astonishing accuracy of the bullets up to a distance of 15 m, although most bullets started tumbling in flight. The muzzle velocity ranged from 90 to 290 m/s, reaching $\frac{1}{3}$ to $\frac{1}{2}$ of the muzzle velocity when fired from a conventional handgun. The muzzle energy ranged from 40 to 290 J. The penetration depth in 20% gelatin from close-range shots usually exceeded 18 cm with a maximum value of 26 cm.

The smooth bore of most barrels results in a lack of suitable markings on the bullets, so they cannot be matched to the weapon. Only the cartridge case has identifying marks from firing pin impressions, but it remains inside the weapon. In cases where the bullet is recovered, there is the unusual finding of missing firing marks (Fig. 4). In the case of missing bullets because of perforation, the unusual weapon cannot be suspected. Hence, pen guns might have been used more frequently than is known, especially for murder.

But wound ballistics can also give a clue to pen guns. In the case reported, perforation and deformation of the bullet would have been expected. A contact shot with a 0.22 lr HV HP bullet fired from a conventional firearm results in a muzzle velocity of approximately 400 m/s. Considering the given trajectory without contact to bone, this velocity would have been sufficient to cause complete perforation and probably deformation of the bullet. Instead, there was a non-deformed bullet inside the corpse. In 10% gelatin (4°C) Fackler and Malinowski [1] found a

26.5 cm long trajectory for a mushroom-shape deformed 0.22 lr HP bullet with an impact velocity of 388 m/s and a 36.5 cm long trajectory for a non-deforming 0.22 lr solid lead bullet with an impact velocity of 342 m/s.

When encountering unusual findings during an autopsy, such as missing firing marks on a bullet or signs of low impact velocity (e.g. penetration, no deformation) compared to the usual impact velocity (e.g. perforation, deformation) of a given bullet, this type of firearm should be considered.

References

1. Fackler M, Malinowski A (1985) The wound profile: A visual method for quantifying gunshot wound components. *J Trauma* 25:522–529
2. Jones SR, Besant-Matthews PE, Williams FJ, Stahl CJ (1974) Injury potential of a reloaded tear gas pen gun. *J Forensic Sci* 19:812–819
3. Jones SR, Stahl CJ, Harriman JJ (1975) Ballistic studies and lethal potential of tear gas pen guns firing fixed metallic ammunition. *J Forensic Sci* 20:261–273
4. Kapusz N, Racz J, Tiess D (1968) Gefährliche Augenschußverletzung durch das Projektil einer mit Zündholzköpfchen gefüllten, explodierenden Kugelschreibermine. *Wiss Z Univ Halle XVII, H 4*:583
5. Koops E, Flüs K, Lockemann U, Püschel K (1994) Tödliche Schußverletzungen in Hamburg 1966–1991. *Arch Kriminol* 193:15–22
6. Oxley DW (1977) An unusual tear gas gun fatality. *J Forensic Sci* 22:606–609
7. Schulz G, Schewe G (1978) Todesfälle mit ungewöhnlichen Schußapparaten. *Beitr Gerichtl Med* 36:415–418
8. Sellier K (1977) Schußwaffen und Schußwirkungen II. Schmidt-Römhild, Lübeck, pp 168–170
9. Smialek JE, Ratanaproska O, Spitz WU (1975) Accidental death with tear gas pen gun: A case report. *J Forensic Sci* 20:708–713
10. Stahl CJ, Davis JH (1969) Missile wounds caused by tear gas pen gun. *Am J Clin Pathol* 52:270–276