## H11 The Strange Trajectories of Death: Avtomat Kalashnikov—The New Weapon of the Garganic Mafia

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**Learning Overview:** The goal of this presentation is to review wound ballistic evidence that comes from a new murder weapon used by the Garganic Clans (the Apulian Mafia in southern Italy): the Avtomat Kalashnikov (AK). This presentation focuses on macroscopic and histological findings used to distinguish between different weapon injuries, with particular regard to the wounds produced by the AK-47 rifle and AKM-74 missiles.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by showing the need for a different approach to autopsy because of the high-velocity tumbling and fragmentation of AK bullets, describing their unusual trajectories in the body.

In the past few years, the Clans of the Gargano Mafia have radically changed their methods of murder. In fact, the methods of execution were characterized by the propulsion of multiple shots from firearms (shotguns), some of which exploded in the face, serving the double purpose of killing the victim and simultaneously scarring the body that would later be seen by relatives. However, in the past three years, they have changed "the murder tool": in addition to the usual weapons, the AK is being used. The Garganic Clans use the AK not only for its high-offensive fire potential, but also because it is a symbol of power among the rival clans.

The AK is a gas-fired, selective assault rifle, developed in the Soviet Union, that comes from military scenarios. The original version (AK-47) of this weapon fires the 7.62mmx39mm cartridge with a muzzle velocity of 715m/s. The next version (AKM-74) of this weapon converted the rifle to the intermediate-caliber, high-velocity 5.45mmx39mm cartridge with a muzzle velocity of 900m/s. The different characteristics of these projectiles in comparison with other known firearms (shotguns, handguns), such as mass, caliber, velocity, shape, and material, explains different missile-tissue interaction.

The many and different types of weapons used for the "new" homicides, and the presence of multiple entrance wounds on the victim's body (average ±35), forced the use of a different methodological approach to the decedent. This study reports a summary of wound ballistic evidence from nine cases of homicide committed with multiple weapons, including the AK from the Garganic Clan's wars. At the primary crime scene, ballistic elements were collected. Then, an external regional examination and radiological investigation (X-rays, Multi-Slice Computed Tomography (MSCT)) of the body were performed to detect the bullets.

The gross-examination of the head showed the AK bullets produced shattering of bone. The macroscopic form of the entrance wound of the AK bullet into soft tissues was not constant and depended on the presence of previous interactions with other objects (e.g., car doors). Likewise, the shape of the exit wound was not regular and depended on the injured tissues. When the AK47 bullet passed only through soft tissues, the instability characteristics of the 7.62mmx39mm bullet led to a net via the parenchymatous organs, with holes approximately 1.5cm in diameter. Extremely complex, non-linear, and multiple, spreading intracorporeal trajectories were observed. This phenomenon is due to the destabilization of the bullet during penetration (tumbling phenomenon) and its fragmentation into small and separate parts.

The histological examination of the entry and exit wounds and of the injured organs showed loss of tissue structure, cavitation, vacuolation, few red blood cells, perivascular ring hemorrhages, the presence of passive transport elements (muscular and cutaneous elements in liver), and foreign bodies. These histological findings are different from the lesions produced by low-velocity ammunition.

**Avtomat Kalashnikov, Histological Findings, Tumbling**