

# Observations regarding the dynamics of confrontation in forest and urban environments: the possibility of close-range and back shots without indication of execution

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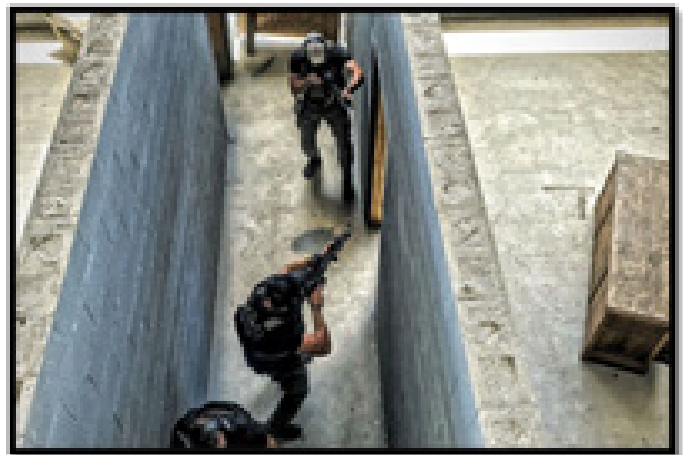
## Letter to Editor

I submit this letter with the purpose of contributing to the technical-scientific discussion on the interpretation of ballistic findings in armed confrontations involving Brazilian public security forces. The subject is of particular relevance in light of operations carried out against drug traffickers—classified by some analysts as narcoterrorists—and also against militia members, all of whom are recognized as criminal groups exercising intense territorial control and significant firepower in several regions of the country. The presence of these agents, widely reported in official documents and intelligence reports, constitutes a notorious fact that does not require specific proof.

Armed confrontations involving police forces and criminal groups in peripheral urban areas and forested regions have become increasingly frequent in the Brazilian scenario. These clashes generally occur against drug traffickers, narcoterrorists—as they are referred to by part of the literature and public opinion—and militia members, all actors undeniably involved in violent dynamics that dispense with individual proof due to the broad notoriety of the phenomenon. Such confrontations present peculiar characteristics: high target mobility, irregular terrain, limited visibility, multiple threat vectors, and, above all, the predominance of rifle fire at variable distances, often less than a few meters.

Close-range gunfire in an urban confrontation is a high-risk tactical situation known as Close Quarters Battle (CQB). In these scenarios, proximity to the target is minimal, requiring specialized techniques and immediate decision-making by security forces.

So that the reader may understand how confrontations occur in urban combat, we provide a photograph taken from the internet showing special forces training and the proximity inherent to such engagements.



In public debate, shots fired from behind or at close range commonly generate immediate suspicion of execution. However, the specialized literature on confrontation dynamics, forensic ballistics, and human behavior under extreme stress demonstrates that such injury patterns are compatible with real firefights, especially during tactical progression operations in forests or dense urban areas. It therefore becomes relevant to clarify, on a technical-scientific basis, how these interactions are structured and why shots to the back may occur within the operational normality of an engagement.

To help the reader understand how shots to the back may occur in urban combat confrontations, we provide a photograph taken from the internet illustrating a possible scenario in which this may happen.



We may also cite a situation that can occur both in forest confrontations and within communities, when teams move to establish a perimeter around offenders and, while one part of the group is engaged in direct confrontation, another part moves to close the perimeter, approaching from behind. In this context, there is no possibility of attempted surrender due to the ongoing confrontation, which could result in redirection of fire and compromise the integrity of the approaching team.

In the illustration provided alongside, we seek to demonstrate the reality of what occurs when the perimeter closes and shots are fired, potentially striking the dorsal region of those involved, without this constituting an execution, but rather merely a consequence of a firefight. In such circumstances, as a response to unjust aggression resulting from shots fired by the second team, it may occur that someone is struck in the back, which in no way can be interpreted as execution.



The interpretation of traces left on bodies and within the confrontation environment requires detailed contextual analysis, especially when signs of close-range fire (such as powder tattooing and soot) or gunshot wounds to the posterior region of the body are present. Such findings, sometimes hastily and erroneously interpreted as suggestive of execution, are fully compatible with real confrontations, both in forested areas and in densely built urban zones. This letter seeks to demonstrate, based on reference literature

and forensic experience, that these ballistic patterns are part of legitimate combat dynamics and do not constitute isolated evidence of execution.

Armed confrontations in forest, jungle, or dense woodland environments present particularities that significantly affect shot dynamics, the distance between antagonists, and the interpretation of traces found on the body. Irregular topography, dense vegetation, limited visibility, sound dampening, and the need for silent progression make encounters with opponents unpredictable and may occur at distances of less than one meter. In such situations, instinctive, reactive, or moving shots are common, favoring the formation of powder tattooing and other typical close-range indicators.

Similarly, Brazilian urban operations—in favelas, densely populated conglomerates, areas with overlapping constructions, alleys, narrow passageways, and irregular structures—also impose severe limitations on the visual field and maneuvering space. Police action in these locations occurs predominantly against armed groups such as drug traffickers, narcoterrorists, and militia members, whose presence is recognized, notorious, and widely documented. These environments favor immediate contact, ambushes, and sudden confrontations in which close-range shots and shots to the back are possible and fully compatible with a real engagement. Therefore, the characterization of powder tattooing, soot, or posterior projectile entry cannot be interpreted in isolation as evidence of execution and must be analyzed within its operational and tactical logic.

## Operational context of the confrontation

### *Operational dynamics of confrontations in forest and urban areas*

Environments of dense vegetation and disorderly urbanized communities share critical factors: narrow corridors, irregular cover, shadowed areas, segmented visibility, and lines of progression that often force police teams to advance toward gunfire whose origin is not immediately identified.

Criminal groups in these regions typically operate in dispersed formations, performing rapid movements of advance, retreat, and flanking, using terrain and obstacles as cover. Typical behavior observed in videos, police investigations, and operational reports describes offenders running between structures, trenches, alleys, or tree trunks, alternating firing positions. In this context, the incidence of shots at non-frontal angles—lateral or posterior—ceases to be an exception and becomes a common feature of the operational theater.

### *Forest environment*

Confrontations in dense forest areas involve operational characteristics that enhance close contact:

- I. Extremely short lines of sight;
- II. Dense vegetation preventing identification of the opponent until the final moments;
- III. Sound dampening, hindering perception of approach;
- IV. Police progression in compact and silent formations;
- V. High probability of sudden encounters at distances under three meters.

Studies conducted in jungle operations and military manuals (COT/DPF, National Force, FM 90-5 – Jungle Operations) demonstrate that the first shot in such environments frequently occurs between 0.5 and 3 meters.

### **Dynamics of the confronting forces**

In the scenario considered, the engagement occurs between:

- I. Police forces, wearing dark uniforms, advancing tactically, discreetly, and in a coordinated manner;
- II. Armed offenders—drug traffickers, narcoterrorists, or militia members—who employ camouflage clothing, prior knowledge of the terrain, and ambush techniques.

The combination of low visibility, constant movement, and shortened distances exponentially increases the likelihood of reactive, instinctive, and close-range shots.

### **Close-range and back shots: natural behavior in real confrontations**

Two situations, widely recognized in combat literature and forensic practice, deserve emphasis:

#### **I. Police progression against a partially concealed target**

The officer advances while under fire. The offender, positioned behind obstacles, may expose only part of the body. When moving to new cover, the offender may be struck at posterior angles, even without having his back turned at the initiation of the shot. Sudden changes in direction generate varied ballistic profiles.

#### **II. The offender runs and fires backward**

This is one of the most classic and documented configurations in the investigation of confrontations. Upon perceiving police advance, the offender flees while simultaneously firing backward, aiming imprecisely. This maneuver, known in military literature as *backward shooting during retreat*, causes:

- I. Unstable firing mode;
- II. Torso rotation;
- III. Exposure of the back at different angles;
- IV. Drastic reduction in trajectory control.

While running and firing backward, the offender frequently loses balance, abruptly changes body orientation, and presents the back as the predominant surface. In this pattern, shots to the back are fully compatible with the dynamics of combat.

In such cases, forensic examination may identify posterior wounds without any stigma of execution:

- I. Physiological position of flight;
- II. Chaotic dispersion of projectiles;
- III. Absence of contact-shot patterns;
- IV. Consistency with witness reports and recordings.

These elements form a typical confrontation scenario, not an execution.

### **Forensic characteristics**

According to classical forensic medicine literature, close-range shots may produce:

- I. Powder tattooing (dermal impregnation by partially burned powder);
- II. Soot deposition;

III. Scorching;

IV. Wiping ring and regular entry margins.

These findings are widely described by Genival Veloso de França, Di Maio, Franchini, and Ribeiro.

### **Natural operational occurrence**

In real confrontations, especially in forests or restricted urban environments:

- I. Police officers and offenders may involuntarily reduce distance between one another;
- II. The aggressor may suddenly appear at less than two meters;
- III. Shots are frequently fired while moving;
- IV. Weapons may be partially supported, tilted, or unstable.

International literature highlights that immediate contacts (“close-quarter gunfights”) produce powder tattooing even in legitimate confrontations, without any indication of execution.

### **Examples from the literature and real cases**

#### **International literature**

Di Maio reports that gunfights in confined environments frequently result in powder tattooing, even in lawful operations. FBI studies show that approximately half of police confrontations occur at distances below two meters.

#### **National literature and studies**

Brazilian research in jungle areas has identified “immediate contact pockets,” with shots fired at less than one meter. SENASP reports on the Legal Amazon also document such occurrences in real confrontations involving heavily armed criminal groups.

#### **Forensic experience**

Analyses conducted by different forensic institutes show that oblique shots—ascending, lateral, or fired while running—may produce atypical powder dispersion patterns, simulating close-range fire even when the shooter is not close to the target.

### **Forensic assessment: absence of evidence of execution despite wound location**

To rule out the hypothesis of execution, the forensic expert must assess, in an integrated manner:

The characterization of execution requires objective signs:

- I. Contact or very close-range shot with a highly specific pattern;
- II. Absence of confrontation dynamics;
- III. Static positioning of the victim;
- IV. Repetitive pattern of shots to vital regions at close range.

Additionally:

- I. Operational and tactical context of the confrontation;
- II. Compatibility of projectile trajectories with movement;
- III. Absence of signs of physical restraint;
- IV. Absence of evidence of contact shots;
- V. Relationship between body position, vegetation, and cartridge dispersion;

#### VI. Convergence of testimonies, traces, and scene reconstruction.

Only the set of factors allows technically grounded conclusions.

### Final considerations

Criminal forensics plays a crucial role in preventing mistaken interpretations and hasty analyses based solely on common sense. Forest and precariously urbanized scenarios produce highly dynamic confrontations in which lateral or posterior shots, including at close range, occur as a direct consequence of the movement of those involved.

The purpose of this report is to contribute to public and technical understanding of combat dynamics, reinforcing that shots to the back, when inserted in a real tactical context and in situations such as flight while firing backward, do not in themselves constitute evidence of execution, but may be fully compatible with effective armed confrontations.<sup>1-14</sup>

### Conclusion

In confrontations involving security forces and drug traffickers, narcoterrorists, or militia members, both in forest environments and urban zones, the occurrence of close-range shots and shots to the back is entirely possible without any automatic implication of execution. Combat dynamics, topography, low visibility, and constant movement of antagonists make such findings expected and compatible with real engagements.

Forensic analysis must therefore be broad, contextual, and well-grounded, avoiding hasty conclusions based on a single ballistic element. Specialized literature and accumulated experience reinforce that powder tattooing, soot deposition, and posterior projectile entry are conditions frequently present in legitimate confrontations.

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None.

### Conflicts of interest

The Authors declare that there is no conflict of interest and that authorization has been obtained.

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