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A Case Study on the Determinant Role of Forensic Analysis in the Identification of Fabricated Firing Crime Scene

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ABSTRACT: In the investigation of criminal cases, the crime scene inspection and investigation play a crucial role in the interpretation of modes operandi and solving the crime. Among the various crime scenes, the firearm-related crime scene investigation is more complex as it is influenced by several factors. The range of fire, direction of fire, firearm and ammunition used in the crime are the key factors in the investigation of the firearm-related crime scene to identify modes operandi and motive of the crime. This case study presents a brief report of a crime scene related to firearm, which is registered in one of the police stations of Chhattisgarh state. The case is related to the firing on one of the local leader by some unknown people at the time when he was travelling in his car. The crime scene was keenly investigated by the authors on the basis of all possible aspects of ballistics and it has been established that the crime scene is fabricated and the victim himself is the culprit. The local leader himself had fired on his car to take advantage of human sentiments in the election. Hence, this case study is a significant contribution to the forensic science fraternity as it deeply reveals the forensic aspects of crime scene investigation related to firearm cases to help law enforcement.

KEYWORDS: Crime Scene Investigation, Ballistics, Firearm, Modes Operandi, Direction and Range of Fire.

I. INTRODUCTION

In the past few decades, India witnessed a new trend of rising firearm-related crimes [1]. Especially among Asian countries, India leads firearm-related crimes in 2023 [2]. The increase in criminal cases related to firearms needs forensic expertise for precise interpretation of the scene of crime and identify the nature and modes operandi of the crime [3]-[6]. The examination of crime scenes involving firearms is very complicated because of a number of circumstances. The analysis and interpretation of such crime scenes involve several factors to be considered [7]-[9]. The important factors pertaining to the firearm-related crime scene investigation are as follows [3]:

- i. Range of fire,
- ii. Direction of fire,
- iii. Firearm and Ammunition used in crime etc.

This paper presents an important case study of a crime scene related to firearm, which is registered in one of the police stations at Chhattisgarh state. The aim is to demonstrate, how keen observation of ballistics aspects can help to determine the motive and modes operandi of firearm-related crimes.

The present paper is organized into the following sections, section II provides the case details and section III deals with the detailed description of the crime scene investigation performed by the authors. Sections IV and V present the methods and materials used for forensic analysis along with the details of crime scene reconstruction respectively followed by section VI, which comprises detailed discussions of findings. In the end, section VII presents the concluding remarks of this case study.

II. CASE DETAILS

An FIR is registered at one of the police stations of Chhattisgarh state against some unknown people related to firing on a local leader at the time when he was travelling in his car. The local leader was travelling on a side road, where CCTV

cameras are not available and since the incident was happened in the early morning, there were no eyewitness. The local leader reported the incident to the police, then the police reached the spot.

III. CRIME SCENE INVESTIGATION

On the call of the police, the authors along with the sub-staff reached the concerned police station where the evidence car was parked and the victim was also present. At the very first step, the following statements of the victim and police officers who first visited the crime scene were recorded to understand the crime sequence.

- i. According to the victim two unknown people on the bike were overtaken his car and fired two rounds on the car and run away. Due to the large distance of the shooter from the car victim was not able to identify them.
- ii. According to police officers, on receiving a call from the victim they immediately visited the crime scene and seized one empty cartridge of 7.65 × 17 mm calibre from left viper of car and then took the car into custody.

After taking statements, the initial observation of the car was performed by the authors at the police station, in which two holes: the first of size 1.8 cm × 1.6 cm located at the slightly right-mid part of the windscreen glass and the second of size 1.25 cm × 1.5 cm present at the slightly right side of the bonnet of the car have been found as shown in Fig. 1. The close observation of both the holes reveals that they were made by the impact of bullet.

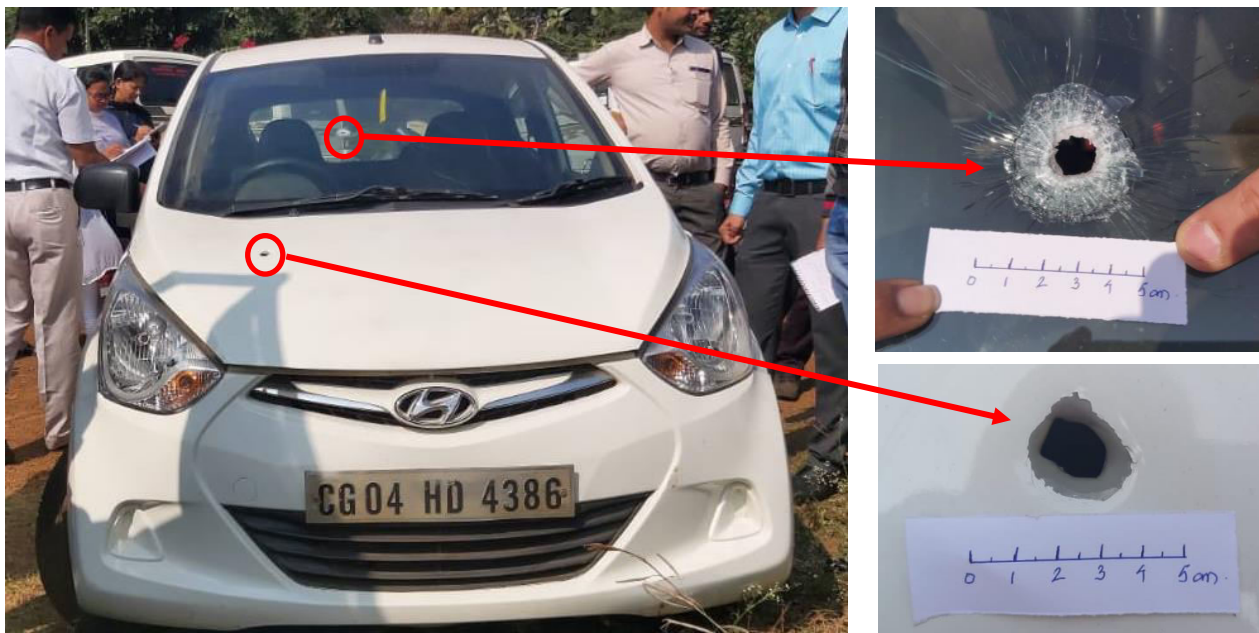


Fig. 1: Two holes found on the car.

The inside observation of the car was then performed in which a hole was found at the corner of side seat of the driver (Fig. 2) and the next hole is found at the mid of the back seat of the car (Fig. 3).



Fig. 2: Hole found at the corner of side seat of the driver.

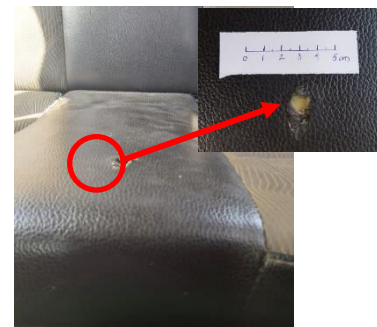


Fig. 3: Hole found at the mid of the back seat of the car.

This observation leads to estimate the path of the first bullet entered from the windscreen glass.

- The estimated path of the first bullet: entry from the windscreen glass of the car then hits the corner of the side seat of the driver and then finally made a hole at the mid of the back seat of the car as shown in Fig. 4.



Fig. 4: Estimated path of the first bullet.

Similarly, the travelling path of the second bullet hole found at the bonnet of the car has also been performed.

- The estimated path of the second bullet: entry from the bonnet of the car then hits the oil pot then finally strikes the metal part as shown in Fig. 5.

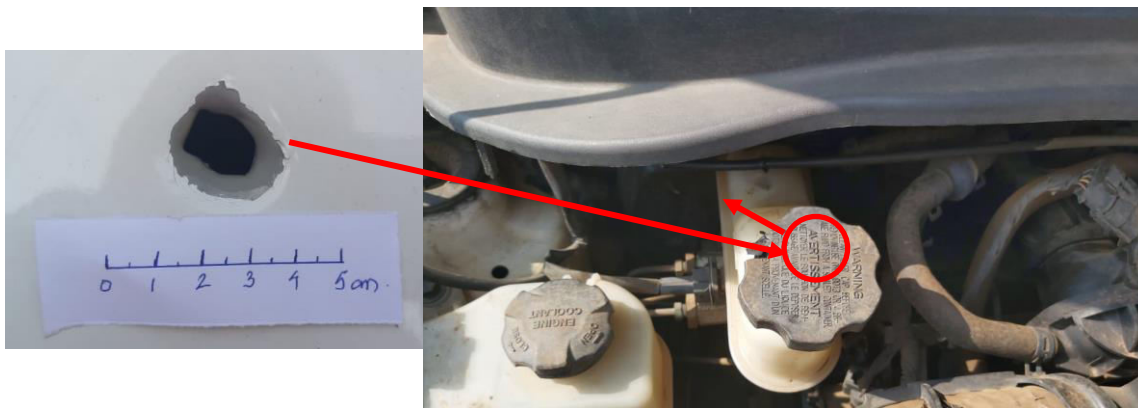


Fig. 5: Estimated path of the second bullet.

IV. METHODS AND MATERIALS

In this case study of the firing crime scene, since the incident happened at the side road where no CCTV cameras were available and due to the early morning incident no eyewitnesses were available to understand the crime. Therefore, based on the statement of the victim, two hypotheses have been framed as described below to investigate the crime scene and to estimate the modes operandi of this crime incident:

- The distance of the shooter is large from the car (H1).
- The victim is inside the car at the time of the firing instance (H2).

In order to validate the above two hypotheses H1 and H2, the crime scene was reconstructed by the authors at the actual site in the presence of the victim and the police officers (Fig. 6).

V. CRIME SCENE RECONSTRUCTION

The car was taken to the actual crime site and after reconstruction of the crime scene, following observations have been performed (Fig. 7 to Fig. 9):

- According to the directions of the first bullet hole, a thread have been taken from the hole located at the mid of the back seat, corner of the driver's side seat and the hole at the windscreen glass towards the outside of the car as shown in Fig. 7.



Fig. 6: Crime scene reconstruction at the actual site of the incident.



Fig. 7: (a) Direction estimation of the first bullet by authors and (b) direction estimation of the first bullet was also done by the victim in the crime scene reconstruction.

- The scientific measurement of the distance of firing for a person of height approximately equal to the authors or victim is obtained as only 1.35 meters from the front of the car as shown in Fig. 8. This finding reveals that the distance of the shooter is much smaller than the victim's statement.
- From this small distance, the victim can easily identify the shooters. Hence, the firing distance measurement clearly rejects the first hypothesis H1.
- During, the inspection of the interior of the car, several small glass fragments have been found over the driver seat, its side seat and the dashboard of the car, which clearly indicates that no one was sitting in the driver seat at the time of firing. This keen observation eventually rejects our second hypothesis H2 that the victim was at the driver seat at the time of firing.



Fig. 8: (a) Height of firing measurement as per authors and victim and (b) Firing distance measurement from the front of the car in the crime scene reconstruction.

- Finally, one empty cartridge of 7.65×17 mm calibre was found on the road near to left side of the car (Fig. 9).

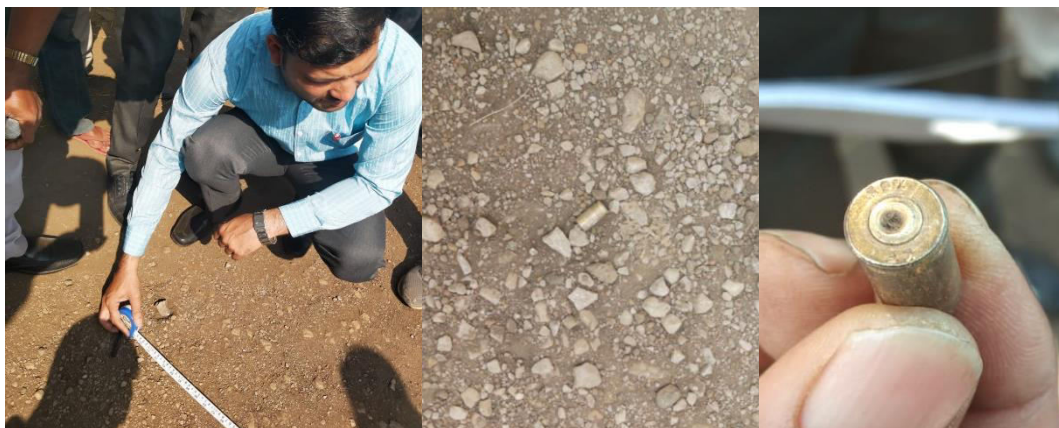


Fig. 9: One empty cartridge of 7.65 mm calibre was found on the road near to left side of the car.

VI. DISCUSSIONS

The scientific evaluation of firing direction, height and distance along with the keen observation of the crime scene, clearly rejected the hypotheses framed by the authors and validated that the victim himself fired on his car. After some interrogation of the victim at the crime scene along with the facts obtained from the crime scene investigation and reconstruction, he admitted that he himself committed this crime by firing on his car.

VII. CONCLUSION

This paper presents an important case study of a crime scene related to firearm in which the victim has created a fake crime scene to take some advantage in local elections. The paper clearly demonstrates how the keen observation of ballistics aspects can help to determine the motive and modes operandi of firearm-related crimes. Hence, this case study is a significant contribution to the forensic science community to develop a deep understanding of the forensic analysis of crime scene investigation in connection with firearm-related crimes.

VIII. ACKNOWLEDGEMENT

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