Sri Lanka Journal of Forensic Medicine, Science & Law — June 2026;17(Special Issue):33-37
DOI: https://doi.org/10.4038/sljfmsl.v17i5.8092

CASE REPORT

SUICIDE BY AN IMPROVISED FIREARM, FIRECRACKER POWDER AND A HOMEMADE, LATHE-TURNED PROJECTILE: A CASE REPORT

Karunatilake CD*, Alagiyawanna AMATRK, Rajaguru CK
Colombo North Teaching Hospital, Ragama, Sri Lanka

ABSTRACT

Introduction: In Sri Lanka, most suicides are by hanging or poisoning, with firearm-related deaths being rare due to the regulation of the ownership through the “Firearm Ordinance”. Yet, improvised weapons may occasionally be used by individuals with technical skills who attempt to replicate firearm mechanisms. Black powder, easily obtained from firecrackers, once confined inside a metal tube, produces enough pressure to drive a projectile with surprising force. This case report describes an improvised firearm, propellant, and projectile used in a suicidal shooting and underlines the value of recognizing non-conventional gunshot injuries in forensic work.

Case Presentation: A middle-aged man was found dead in his lathe workshop, lying on the back. He had a large wound on the right side of his head and a smaller wound on the left. A set of steel tubes clamped into a vice, a loose metallic projectile nearby, and a cigarette lighter in his hand suggested that he had constructed and used a homemade gun. The workshop also contained several handmade bullets and steel sheets marked by projectile impacts, indicating repeated experimentation. At autopsy, the right-sided wound showed blackening and burning typical of a contact discharge, while the left side showed a smaller exit wound. The skull was shattered with inward beveling at the entry and outward beveling at the exit, and the brain was extensively damaged. Calculations showed that about 72 g of black powder could generate roughly 216 kJ of energy, enough to propel a small projectile at speeds comparable to modern firearms. Death was certified as cranio-cerebral injuries caused by a metallic projectile traveling through the head.

Conclusion: This case demonstrates that even firecracker powder, when confined, can act as a lethal propellant. The resulting wounds were indistinguishable from those caused by regular firearms. Forensic specialists should therefore consider the possibility of improvised weapons, especially in places where conventional firearms are scarce but pyrotechnic material is readily accessible.

Keywords: *Firecracker; gunshot; suicide*

Corresponding author: Karunatilake CD
drkarunatilake@gamil.com
https://orcid.org/0009-0007-1287-3182

ARTICLE HISTORY
Received: 30.11.2025
Received in revised form: 26.02.2026
Accepted: 11.03.2026
Available online: 10.06.2026

INTRODUCTION

Although improvised firearms are not commonly encountered in everyday forensic practice, they tend to emerge in the hands of people who possess mechanical skill and a certain level of curiosity, or desperation. These devices often evolve from experimentation rather than criminal inventiveness. When a metal tube is sealed, packed with pyrotechnic material, and paired with a hand-made projectile, the combination can generate ballistic forces not far from what one might see in a conventional firearm[1–3].

The difficulty for forensic pathologists is that the injuries produced by such improvised devices look remarkably similar to those caused by factory-manufactured firearms. Entry and exit wounds behave according to physics, not the sophistication of the weapon[1,4]. The surrounding context, the workbench, the tools, the sketches, and the traces of experimentation often provide insight into how the fatal event unfolded.

This report describes a case in which a machinist, clearly familiar with tools and metalwork, appears to have developed a homemade discharge device using a steel tube and firecracker powder. His drawings, test strikes on a steel sheet, and half-completed bullets tell a story of gradual trial and error leading up to a single, fatal act. The case underscores the importance of integrating the autopsy findings, the physical environment, ballistic estimates, and the behavioural clues left behind.

CASE PRESENTATION

The deceased, a middle-aged machinist, was found lying on his back near the entrance of his small workshop. The door stood open, and the scene was undisturbed. On the concrete floor beside him was a set of four steel tubes, welded together to minimise relative movement. Each tube was roughly 30 cm long and held in a bench vice on the ground (Figure 1). The arrangement suggested that he had positioned the device intentionally at floor level and fired it while lying next to it.

Figure 1: Steel tubes clamped in a bench-vice (black arrow) next to the deceased.

Inside the workshop, empty firecracker casings, a fine dusting of black-coloured powder, several partly finished metal projectiles, and neatly drawn sketches (Figure 2a) showing different projectile designs were found. A steel sheet propped against the wall displayed several circular impact marks, some shallow, others punched in deeper, indicating repeated test firing (Figure 2b). A cigarette lighter remained in his right hand, which was in a cadaveric spasm (Figure 3).

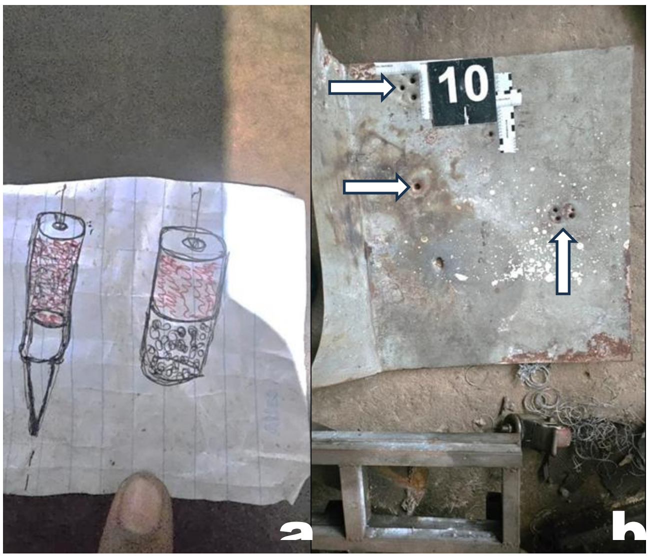

Figure 2: Hand-drawn sketches of a projectile (a) and a metal sheet with circular impact marks (white arrow) (b).

Figure 3: Cigarette lighter held in the right hand (white circle).

Among the items collected from the scene was a fully machined metallic projectile, 3.0 cm long, 1.8 cm in diameter, and weighing 20 g (Figure 4). Its clean finish and symmetry matched the drawings found inside the workshop. The steel tube used as the firing chamber was open at one end and sealed at the other, with a smooth inner surface, fitting the typical configuration of a simple pipe-gun-type device.

The collected projectile was not sent for ballistic examination. Taken together, the scene painted a picture of a man who had been experimenting, possibly for days, before the final event.

Figure 4: Fully machined metallic projectile (black arrow) found at the scene.

The most striking feature on the body was a large, stellate-shaped defect on the right parieto-temporal area of the head, measuring about 8×6 cm (Figure 5a). The wound was blackened with soot deeply embedded in the margins. Hair around the site was scorched and curled. The skull fractures radiated inwards from the entry site, with comminution of the right temporal and parietal bones (Figure 5b).

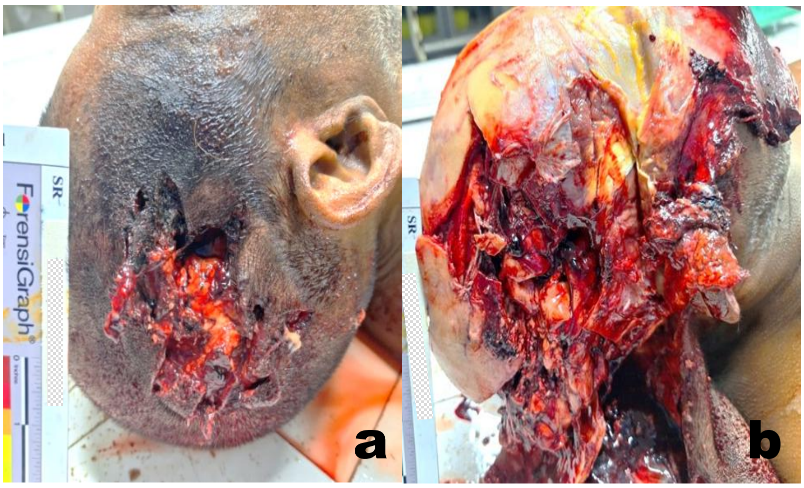

Figure 5: Large, stellate-shaped defect on the right side of the head (a) and massive comminution at the right temporal and parietal bones (b).

On the opposite side, over the left temporal–occipital region, was a smaller, irregular exit wound about 1.5 cm in diameter. Bone fragments were visible, and outer bevelling was noted (Figure 6). The brain was extensively disrupted. Both cerebral hemispheres showed laceration, cavitation, and tissue displacement, with partial extrusion through the exit wound. The rest of the internal examination did not reveal any disease or trauma relevant to the death.

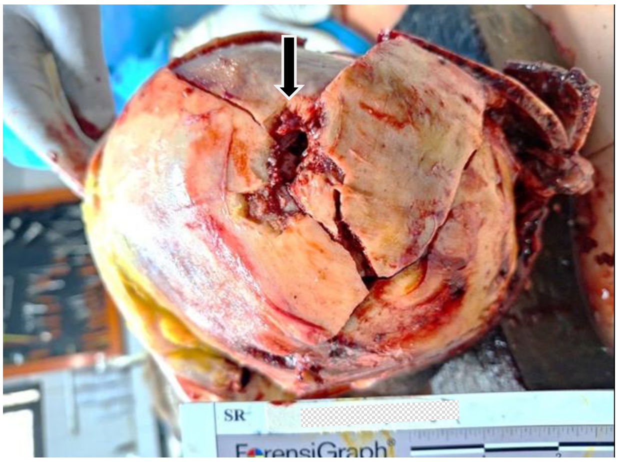

Figure 6: Irregular deficit of the skull on the left side with outward bevelling (arrow).

DISCUSSION

Improvised firearms often surprise people with the amount of energy they can produce. Even a simple mixture used in firecrackers releases significant chemical energy when ignited. Black-powder-type compositions release around 3000 J/gram[5,6], and when confined, the gas expansion can accelerate a projectile to remarkably high speeds.

Based on an internal diameter of 2 cm, the tube would hold approximately 94 cm^3. Using standard density values for pyrotechnic black powder (≈1 g/cm^3), a realistic fill level of around two-thirds corresponds to roughly 60–72 g of powder[5,6]. The presence of multiple empty firecracker casings nearby strongly supported that he had sourced the propellant material from those. Considering the filled mass of 60g of powder, the total energy produced would be 180 kJ. Estimated energy transfer of black powder; 30% - 40%, without the loss due to friction[7]. If a fraction of 5% of energy is transferred as kinetic energy, it amounts to 9000 J. But for a 20 g projectile, even such small percentages can translate into velocities exceeding 900 m/s, which exceed common handgun muzzle speeds[6,8,9]. These velocities match well with the destructive head injury observed.

Similar cases have been reported internationally, usually involving homemade weapons produced by individuals with technical backgrounds or significant familiarity with tools[9-11]. They often show evidence of experimentation, including test shots, sketches, and prototypes, which were clearly present here.

What distinguishes this case is the positioning of the device: clamped in a vice but intentionally placed on the floor, with the deceased lying next to it. It suggests he took deliberate measures to brace the device and align himself before firing. That behaviour, along with the absence of any defensive injuries, disturbance, or contradictory evidence, strongly supports suicide.

LIMITATIONS

Some additional examinations were not carried out in this case. A pre-autopsy X-ray was not performed. This could have helped document the exact distribution of metallic fragments before dissection. Gunshot residue swabs were not taken from the hands. Swabs were also not obtained from the soot-blackened wound margins. Laboratory testing might have provided further confirmation of discharge products. The recovered projectile was measured and examined visually, but no formal ballistic analysis was done. In addition, the wound was not examined for unburnt powder particles, and histological examination of the scalp for propellant deposition was not performed. Despite these limitations, the scene findings and injury pattern were consistent and supported the final interpretation.

CONCLUSION

This case shows how a person with mechanical skill and access to basic tools can produce a functioning and lethal firearm using nothing more than a steel tube and firecracker powder. The resulting injury was indistinguishable from that caused by a conventional gun. What allowed the true mechanism to be understood was not the autopsy alone, but the thoughtful reconstruction of the environment he created: the drawings, the test marks, the scattered casings, and the carefully positioned device. It reinforces a central lesson in forensic pathology: when faced with an unusual firearm-type injury, the body tells part of the story, but the room tells the rest.

ACKNOWLEDGEMENTS

None.

CONFLICTS OF INTEREST

The authors declared no conflicts of interest.

ETHICAL ISSUES

The presented case was conducted for medicolegal purposes, and the findings were used for academic purposes, according to the institutional guidelines, without divulging the identity of the individual.

SOURCES OF SUPPORT

None

AUTHOR CONTRIBUTIONS

CDK: Conception and design of the work; the acquisition, analysis, and interpretation of data for the work; drafting the work and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. **AMATRKA:** Conception and design of the work; the acquisition, analysis, and interpretation of data for the work; drafting the work and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. **CKR:** Conception and design of the work; the acquisition, analysis, and interpretation of data for the work; drafting the work and revising it critically for important intellectual content; final approval of the version to be published; and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. DiMaio VJM. *Gunshot wounds: Practical aspects of firearms, ballistics, and forensic techniques.* 3rd ed. Boca Raton (FL): CRC Press; 2016. https://doi:10.4324/9780367805715.
2. Heard BJ. *Handbook of firearms and ballistics: Examining and interpreting forensic evidence*. 2nd ed. Chichester (UK): Wiley-Blackwell; 2008.
3. Kneubuehl BP, Coupland RM, Rothschild MA, Thali MJ, eds. Wound ballistics: basics and applications. Berlin: Springer; 2011. doi:10.1007/978-3-642-20356-5.
4. Pollak S, Saukko P, Knight B. Knight's Forensic Pathology. 5th ed. Boca Raton (FL): CRC Press; 2026. https://doi.org/10.1201/b23426.
5. Brunning A. The chemistry of gunpowder. *Compound Interest*; 2014 Jul 2. Available from: https://www.compoundchem.com/2014/07/02/the-chemistry-of-gunpowder/ [Accessed 26th February 2026].
6. Hatcher JS. *Hatcher's notebook*. Harrisburg (PA): Stackpole Company; 1962.
7. Umland H. Internal ballistics of muzzleloaders. *A Short Guide to Celestial Navigation*; Available from: https://www.celnav.de/muzzleloaders/internal_ballistics.htm [Accessed 26th February 2026].
8. Sellier KG, Kneubuehl BP. *Wound ballistics: And the scientific background*. Amsterdam: Elsevier; 1994.
9. Di Nunno N, Viola L, Colucci M, Di Nunno C, Costantinides F. A case of suicide using a home-modified gun. *The American Journal of Forensic Medicine & Pathology*. 2009;30(1):52–6. https://doi.org/10.1097/PAF.0b013e3181873763.
10. Hartwig S, Tsokos M, Schmidt S, Byard RW. Self-constructed shooting devices utilizing manually-impacted firing-pins (suicide machines). *The American Journal of Forensic Medicine & Pathology*.2010;31(2):192–4. https://doi.org/10.1097/PAF.0b013e3181c297f5.
11. Singh BP. Suicide by homemade firearm: a case report. *Medicine, Science and the Law*. 2007;47(4):345–9. https://doi.org/10.1258/rsmmsl.47.4.345.