

Fatal Stud gun injuries: Case reports

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Abstract

Wounds caused by stud guns are not infrequent in construction companies. Reported deaths following stud gun injuries are hardly met with in forensic literature. Also, the pathophysiological mechanism involved in the production of such type of wounds is not very clear. The article presents two reported cases of accidental fatal and stud gun injuries of chest together with a brief review of this type of industrial tool and its ammunition so that we can shed light on the wounding mechanism. The importance of careful post-mortem examination, and detailed investigation of the scene, to reconstruct the event, and to determine the manner of death are included.

Keywords: Stud guns, firearm injuries

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Case reports

The case 1: The body of a 30-year old male was sent to Riyadh medicolegal center. It was near the front gate of a newly constructed building. A discharged stud gun was said to be found beside the body. The only external injury detected was a 2.5x0.5cm deep cutaneous gutter loss, situated 9 cm below the right angle of the lower jaw. The tissue loss was directed downward and forward at an angle of 45° to the midline. At the right side of the trachea, the anterior border of the gutter was presented as a 0.5x0.75 cm oval hole with ragged edges. There was no scorching, no soiling of the wound. X-ray examination of the chest prior to postmortem autopsy demonstrated a retained curved nail like body in the left thoracic region, a cavitory wound track, surrounded by a band of consolidated was identified (Fig. 1).

At autopsy, the track of the nail was traced. It passed through the right sternomastoid. It passed through the right sternomastoid muscle, trachea, traversed the upper and lower lobes of the left lung, then struck the 6th left rib before retained in the left pleural cavity from where it was retrieved. The left pleura contained about 1300 cc of blood; the left lung was partially collapsed. The heart, right lung, and great vessels were intact. Microscopical examination of the guttered wound was unremarkable; the lung tissue surrounding the wound track showed disruption with hemorrhagic

exudation into alveoli and interstitial spaces for about 1.5 cm around the track. The retrieved 4.1 cm long broken curved nail showed distorted tip, scratches, and scrapes on the convex side (Fif.2).

Our findings raised the assumption that, it might be a ricocheted stud. At the scene, we were able to find the rear knobbed segment of the fired stud, as well as the point of impact on a steel gate-post. Information gathered indicated that the deceased was employed to fix the gate to the concrete entrance of the building. In view of our findings as a whole, we deduced that his injury was accidental; as a result of misuse of the tool i.e., he has been stricken by a ricocheted stud.

Case 2. The body of a 35-year old male was examined at Riyadh medicolegal center as being that of a suspected case of homicide by firearm. The external examination revealed a 0.5 cm entrance wound with ragged edges, just below the middle of the right clavicle. There was neither scorching nor soiling of the wound. X-ray examination showed a curved nail-like body, retained in the right thoracic region. A cavitory wound track, surrounded by a band of consolidation was also detected.

At autopsy, the nail track was found directed downward and backward through the upper and middle lobes of the right lung, where it was

recovered. The right pleura contained about 600 ccs of blood, and the right lung was collapsed. The heart left lung and major vessels were intact. Microscopical examination of the entrance wound showed no powder marks within the tissues, while tissues around the wound track showed similar changes, as that described in case 1/ Examination of the recovered a 3 cm long broken distorted nail, showed flattening of its pointed end, as well as scratching on its convex side. At the scene, we were able to find the perforated rear knobbed end of a stud, still in place at a decoration iron end of a stud, still in place at a decoration iron panel fixed to the ceiling. We found that the stud penetrated the panel, but not through the concrete which was found to be guttered opposite to the point of impact. These findings left no doubt that injury was accidental by ricocheted broken stud, rather than homicide. Information gathered by the investigating team revealed that the stud gun was removed from the scene, prior to the arrival of the team, since the deceased was an illegal abider.

Discussion

Stud guns are firearms like devices used in Industry to fire studs into the wood, concrete, and steel (Fig. 3). These tools operate on firearm principles, though they are not classed as firearms; no license is required to obtain and use them i.e. they are not conventionally sold as firearms. To our knowledge, studs are of two types, the flat knobbed rear end studs (Fixation studs), and the perforated knobbed rear end studs (Ceiling hinge studs). The pointed anterior end of the stud is covered with a rimmed plastic cap, which acts as a gas seal within the barrel of the tool to increase propelling power of the stud (Fig.4).

The ammunition utilized by these tools are special explosive blank cartridges, of ranging caliber from 0.22 to 0.38 Spitz and Fisher (1980), described an interchangeable breech plug, that enables a choice of calibers depending upon on the power required for adequate penetration. The blank cartridges are generally loaded with ultrafast burning propellant powder that deteriorates rather than burns. The mouth of the cartridge case is sealed with a cardboard disc (wad) that is the colour-coded end (Fig.4). The pressure created by the propellant charge is too high for a usual firearm to obtain; so, if the wad is removed and a bullet is substituted, the pressure generated by the ultra-fast burning powder will explode the gun. Thus this type of blanks never used in firearms (1) (2) (3) (4). The tool itself (Fig.5) resembles a long breech-loading smooth single barrel, break open pistol. It has built in safety mechanism in the form of a flat face plate

(cup-shaped), attached to the muzzle end of the tool (Fig. 6). To fire the loaded gun the flat face plate requires being pressed firmly against a flat surface before the tool can be fired. For this reason, it has been postulated that the features of stud gun make it unsatisfactory for homicide (2) (5) (6). Reported cases of suicide had been described (7). In both of these cases, the victims fired stud guns to their heads; in both, stellate-shaped everted margins entrance wound, with no soot blackening in the skin. Soft tissue or skull of the deceased was noticed.

Accidental stud gun injury is a usual event at industrial sites. It usually results from the defective guns or, when guns are used on relatively flimsy partitions, where the stud traverses the structure and, flies on to injure or kill someone on the other side (4). Also, when workers use guns for "plinking" at tin cans. They depress the safety guards with one hand and fire with the other (3); or when the tool used by inexperienced workers as in our cases; where scene investigation revealed that in both cases the safety guard was depressed against a raised levelled concrete edge, allowing a relatively wide angled gap, so as the fired stud is discharged tangentially rather than perpendicular to the target point. This faulty technique makes the fired studs strike the impact point tangentially, break and ricochet.

The identified tissue disruption resulted from the physical passage of studs through lung tissue in both cases indicated that studs behaved as a high-velocity missile. Studies on wound ballistics (8) (9) (7) (10) (11) (12) (13) (14) showed that passage of a high-velocity missile through tissues causes the formation of the permanent local track, along which tissues are totally destroyed and permanently lost. Also, that local track is surrounded by a thick consolidated layer of necrotic debris caused by a temporary cavitation effect. The explanation for the observed findings would be attributed to the too high propellant powder, which provides stud with its characteristic high penetration power, so as the destructive effect of the stud would simulate that which results from injury by a high-velocity missile.

To avoid erroneous conclusion, the authors would emphasize on the fact that, the circumstances of death due to stud gun injury result in a puzzling situation in determining the manner of death i.e. accidental, homicidal or suicidal (15), particularly, with unwitnessed deaths, or in case when reliable witnesses are not present at the scene of shooting, studs have proved to have the tendency to tumble

and ricochet, owing to their size and shape. Accordingly, they can cause atypical larger wounds than those produced by ordinary bullets (16). Hence, careful post-mortem examination and scene investigations are mandatory. A post-mortem examination and scene investigations are mandatory. Post-mortem x-ray, autopsy and microscopical examination of the injured tissue, usually yield very important, helpful evidence determining the type and cause of injury. Scene investigation is usually rewarding for determining the relative location of the deceased and the angle of shooting at the time of death. These would make the pathologist able to reconstruct what happened at the time of death.

References

1. Fatteh A. *Medicolegal investigation of gunshot wounds*. Philadelphia: JB Lippicott Company; 1976. 81 p.
2. Polson C, Gee D. *The essentials of Forensic Medicine*. 3rd ed. Pergamon: Oxford Publishers; 1973.
3. Di Maio V. *Gun shot wounds: practical aspects of firearms, ballistics and forensic technique*. Elsevier Science Publications; 1985. 233 p.
4. Knight B. *Forensic Pathology*. Edward Arnold; 1992. 246 p.
5. Cragg J. Nail-gun fatality. *Br Med J*. 1967 Dec 30;4(5582):784.
6. Goonetilleke UK. A stud (cartridge) gun suicide (a case report). *Med Sci Law*. 1976 Jul;16(3):181–4.
7. Di Maio V, Spitz W. Variations in wounding due to unusual firearm and recently available ammunition. *J Forensic Sci*. 1972;17:377.
8. Ting YM. Pulmonary parenchymal findings in blunt trauma to the chest. *Am J Roentgenol*. 1966;98(2):343–9.
9. Larose JH. Cavitation of Missile Tracks in the Lung. *Radiology*. 1968 May 1;90(5):995–8.
10. Owen-Smith M. *High velocity missile wounds*. Edward Arnold; 1981. 15 p.
11. Eric B, Michael T. A pathophysiological examination of the wounding mechanisms of firearms Part I. *Trauma*. 1976;26(3):225.
12. Fackler ML, Bellamy RF, Malinowski JA. The wound profile: illustration of the missile-tissue interaction. *J Trauma*. 1988 Jan;28(1 Suppl):S21–9.
13. Fackler ML, Malinowski JA. The wound profile: a visual method for quantifying gunshot wound components. *J Trauma*. 1985;25(6):522–9.
14. Gordon I, Shapiro H, Berson S. *Forensic Medicine, A guide to principles*. Churchill Livingstone; 1988. 350 p.
15. McCorkell SJ, Harley JD, Cummings D. Nail-Gun Injuries: Accident, Homicide, or Suicide?. *Am J Forensic Med Pathol*. 1986;7(3):192 – hyhen.
16. Spitz W. *Medicolegal investigation of death*. Illinois: Charles C Thomas Pub Ltd; 1980. 269 p.