



Pathology Biology Section – 2010

G107 Nailing the Diagnosis: Features of Fatal Injury Inflicted By Unusual Projectiles and Firearms

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After attending this presentation, attendees will recognize the distinguishing features and potential diagnostic pitfalls of injuries inflicted by uncommon projectiles and firearms.

This presentation will impact the forensic science community by discussing the pertinent characteristics of a variety of wounds inflicted by atypical ammunition or firearms. A ten-year retrospective review of case files at the Cook County Office of the Medical Examiner and a regional collar county yielded seven cases of suicide committed with atypical projectiles or firearms. These include four cases of nail gun suicide and a case of an antique firearm loaded with Phillips head screws used to commit a double homicide-suicide. Additionally, two cases of accidental death involving aerial fireworks mortars were identified which are similar in many ways to two cases of suicidal fireworks injuries that have been previously reported in the literature.

The use of a nail gun to commit suicide is extremely rare, with fewer than ten cases detailed in the literature. It has been previously reported that nails recovered from individuals who have committed suicide remain straight upon entering the body. This is in contrast to reports of accidental nail gun injury where recovered steel nails have been observed to be curved or bent most commonly as a result of ricochet. It has been suggested that one may infer a given injury is accidental if the nails are bent and suicidal if the nails are straight. A case of nail gun suicide is reported with recovery of both bent and straight nails.

The external evidence of injury inflicted by nail guns may be subtle and easily overlooked, especially if the nail is not visible externally. Blood may be minimal or absent both on the body and at the scene. Not until the autopsy examination may the devastating extent of the injuries be appreciated. In three cases of nail gun suicide involving the head and one involving the chest, the injuries were small entrance wounds typically measuring 0.1 inch or less in diameter. The individual with self-inflicted chest wounds was dead at the scene and the three remaining cases had variable survival times.

In contrast to the injuries produced by nail guns, the cases involving the use of an antique firearm produced injuries deceptively similar to close-range or contact shotgun wounds. Radiographic examination identified the atypical nature of the projectiles, short Phillips head screws. Because the load was noncommercial, the number of projectiles (screws) varied between the cases. Additionally, from two cases, paper used as patching to contain the projectiles was recovered from within the wound track.

Atypical projectiles can, of course, produce atypical patterns of injury. Two cases of accidental death involving aerial fireworks mortars show that patterns of injury and soot deposition can be distinctive and, in the absence of additional information, may help identify the use of less common incendiary powders. Although no cases of suicide involving fireworks were found, two cases of accidental death involving fireworks were identified. Both occurred outdoors and had massive craniocerebral

injuries with complete or partial avulsion of the brain as well as thermal injury of the surrounding scalp and skin. The injuries were limited to the head. This pattern of injury is consistent with that seen in suicidal fireworks injuries as described in the literature and highlights the importance of a scene investigation when investigating these deaths.

Perhaps due to the ready availability of more conventional weaponry, suicide using atypical projectiles and firearms remains rare. Despite their infrequency, it is important to recognize the pertinent features of such cases. In nail gun suicide cases involving the head, both bent and straight nails were identified. Many of the wounds in these cases were very subtle and could easily be overlooked. In cases of firearms loaded with atypical ammunition, the external appearance may be that of a close-range or contact shotgun wound. Finally, cases of accidental fireworks deaths demonstrated injuries similar to those described in suicidal fireworks deaths. All of these cases emphasize the importance of obtaining a detailed history, radiographic studies, and performing a thorough scene investigation.

Nail Gun, Fireworks, Atypical Injury