

CASE REPORT

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Suicide by Blasting Caps: A Case Study of Rare Cranial Trauma*

ABSTRACT: Suicide is a deliberate act of ending one's life. Suicide by use of any explosive device, when not involved in a terrorist act, is quite rare in occurrence when compared with other methods routinely utilized. In this paper, we present to the medicolegal community a case of an adult male who committed suicide with blasting caps and the subsequent extensive damage to the cranial hard tissue. Although the cause and manner of death were relatively straightforward, consultation with forensic anthropologists was requested for an anthropological trauma assessment of the highly fragmented skull. After the skull was cleaned and reconstructed, the analysis revealed similarities between blasting cap trauma to the head and high velocity gunshot trauma to the head. Therefore, in a case where some evidence may have been removed or destroyed, forensic analysis involving trauma of this magnitude could result in a misinterpretation of the true mechanism responsible for the osseous damage. In this case, cooperation among the law enforcement agency, coroner's investigators, the forensic pathologist, and forensic anthropologists provided a comprehensive death case analysis.

KEYWORDS: forensic science, forensic anthropology, explosive device, blasting cap, explosion trauma, suicidal explosion, high velocity gunshot trauma, cranial trauma

Blasting caps used as the direct mechanism of a nonterrorist suicidal act are quite rare in occurrence; consequently, articles of trauma analysis associated with this manner of suicide are also scarce within professional journals (1). In this case, the direct mechanism chosen to commit this nonterrorist suicidal act allowed a rare opportunity to share with the medicolegal community the subsequent anthropological forensic analysis of the cranial trauma.

Case Background

In the summer of 2003, the body of a white male was found lying supine on the bed located in the rear sleeping area of a 23-foot-long by 8-foot-wide travel trailer. He was wearing a short-sleeved shirt and canvas-type shorts. All of the trailer's glass windows were closed and screened. The trailer had an electrical connection; however, the interior lights and air conditioner were not functioning because the electrical breakers had been tripped.

The decedent's cranial vault had sustained extensive damage. The skull tissue was desiccated and the vault was void of all soft tissue. Desiccated tissue held the highly fragmented frontal and anterior portion of both parietal bones in an acute forward-superior position. Fragments of the occipital and posterior portion of both parietal bones were separated from the vault and held in posterior-lateral positions by the desiccated tissue. Varying stages of fly pupae were observed on the surface and in the folds of the desiccated tissue.

The axial and appendicular skeleton had not sustained any apparent trauma. Differential decomposition ranging from skin slippage to desiccated tissue was noted postcranially. The upper torso beneath the shirt was completely desiccated from the neck to the waist. Fly pupae were present on the skin surface beneath the shirt.

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Skin slippage, discoloration, and some desiccation were noted on the exposed portions of both arms and hands. Blanched pressure marks outlined the regions covered by the underwear and where the hems of the canvas-type shorts terminated above the knee. The skin beneath the underwear was pliable and flesh toned. Feeding maggots were present from the inner thighs to the groin area. The right thigh was in an advanced state of decomposition with the anterior surface of the femoral shaft exposed. The left thigh was discolored with skin slippage present. Skin slippage and discoloration were noted on the lower portions of both legs and feet.

An electrical power strip with an on and off switch was located between the decedent's left forearm and waist. The shredded remains of a baseball cap were found next to the decedent's left thigh. Two sets of electrical lead wires were located next to the decedent's right shoulder. On both sides of his head were the remnants of a blasting cap that were still attached to each of the electrical wire sets. A vertical tear and burn area were present on a pillow where the blasting cap remnants came to rest. The glass window directly above the decedent's head was completely shattered; however, the screen was still intact. A multi-directional spatter pattern was present on all the walls and ceiling of the sleeping area. No suicide note was located.

A minimal postmortem interval estimate of 6–8 days was based on the last time the decedent was seen alive, the entomological evidence present at the scene, and the stage of decomposition. From the evidence at the death scene, the power strip had been plugged into an electrical wall outlet and the wire ends of the two blasting caps had been inserted into one of the power strip outlets. The blasting caps were placed at or slightly above his ears and the shredded baseball cap may have been used to hold them in place. At the decedent's decision, the power strip was turned on. Due to the blasting cap firing train, the body's condition, associated evidence, personal information, and the decedent having access to blasting caps (more were found on his property), the death was ruled a suicide; however, consultation with forensic anthropologists was requested by the coroner to resolve trauma questions.

Trauma Analysis

Following arrival photographs at the forensic anthropology laboratory, X-rays were taken of the cranial remains. The X-rays confirmed the absence of metal fragments which are commonly associated with gunshot trauma. Over 150 cranial fragments were present after the cranial remains had been cleaned (Fig. 1). No attempt was made to reconstruct the 100 plus fragile fragments of the sphenoid, vomer, ethmoid, inferior nasal conchae, and the orbital plates, as well as the internal table of the frontal bone associated with the sinuses. The remaining cranial fragments were easily reconstructed due to having little or no permanent deformation. Bone fragments from the left and right parietals as well as most of the right temporal region were missing. The missing fragments likely were destroyed from the direct impact of the explosion waves produced by the two blasting caps.

Trauma analysis revealed extensive linear fractures which radiated superiorly, inferiorly, anteriorly and posteriorly from the left and right temporal-parietal regions of the skull (Figs. 2A–2F). The radiating linear fractures traveled across the coronal, sagittal, squamosal, and lambdoidal sutures. Pronounced suture separation occurred from the anterior sagittal to lambda, and for approximately 2 cm from lambda, in both directions along the lambdoidal suture (Figs. 2A and 2D). Additionally, concentric fractures with severe bone fragmentation were evident on the left and right sides of the skull (Figs. 2B and 2F). The force from the blast was powerful enough to produce vertical fracturing alongside the midoccipital



FIG. 1—Overview of cranial fragments.

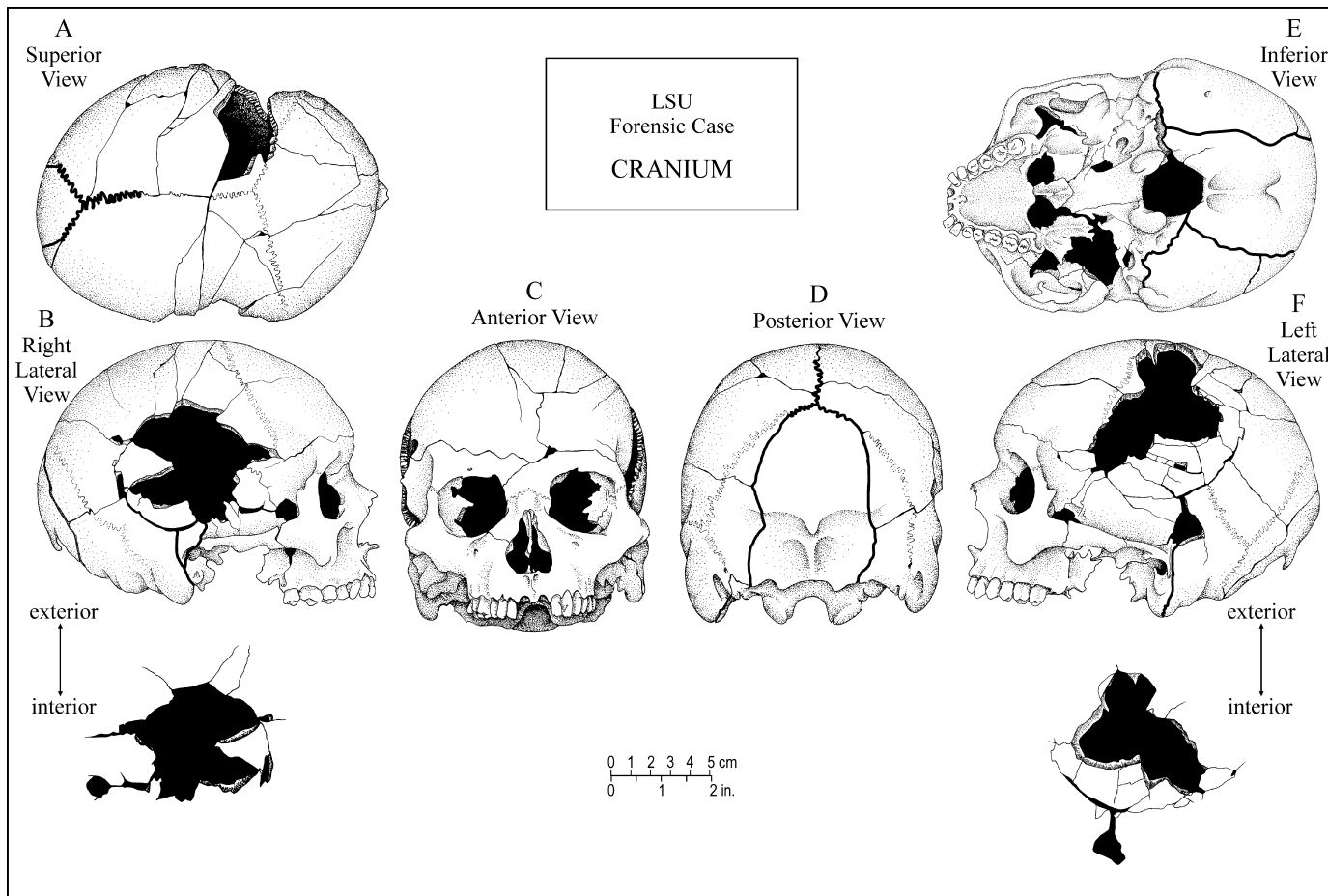


FIG. 2—Overview of cranial trauma (A) superior view; (B) right lateral view; (C) anterior view; (D) posterior view; (E) inferior view; (F) left lateral view.

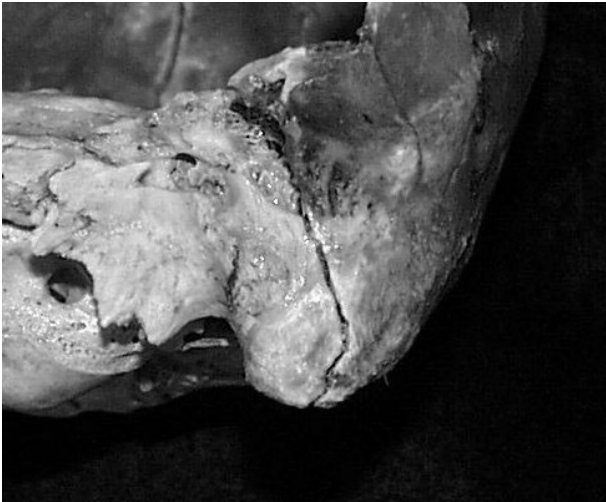


FIG. 3—Vertical fracture of left mastoid.

and through the parietopetrous buttress areas of the skull (Figs. 2B, 2D, and 2F).

Of noted importance were the fractures and subsequent damage sustained to the mastoid regions and associated acoustic meatus. In Figures 2E, 2F, and 3, a massive vertical fracture which splits the mastoid in half travels inferiorly from a concentric fracture across the root of the zygomatic and through the left mastoid process. It terminates at the foramen magnum immediately behind the left occipital condyle. The thin, outer bone structure of the left acoustic meatus is completely missing.

Figures 2B and 2E show two vertical fractures which travel inferiorly from the concentric fracture of the right temporal bone. The larger of the two vertical fractures travels downward across the root of the zygomatic between the external auditory meatus and the right mastoid process. It then continues across the basal portion of the temporal bone, posterior to the jugular foramen, and terminates at the rim of the foramen magnum. The smaller vertical fracture travels downward across the anterior portion of the zygomatic root. It then crosses diagonally through the acoustic meatus, destroying the outer thin bones, and terminates inferiorly into the larger fracture.

Additionally, the cranial fragments around the temporal-parietal trauma sites had beveling characteristics similar to gunshot trauma entrance wounds. The majority of the cranial fragments around these two trauma sites had internal beveling (Fig. 4) with minimal presence of external beveling on the outer table. Vertical fracturing with no internal or external beveling was noted only along the edges of the superiorly-positioned fragments of the left and right parietals.

Remarkably, the mandible was undamaged. Only the anterior surface of the lower left canine was slightly fractured. No damage was sustained to any of the other remaining teeth.

Discussion

Suicide by use of any explosive device, when not involved in a terrorist act, is quite rare in occurrence (1,2). In this particular case, the anthropological assessment not only confirmed the findings from the scene investigation and the autopsy examination, it also revealed, after the skull was reconstructed, how the bilateral placement and simultaneous ignition of the two blasting caps produced extensive cranial damage with characteristics similar to those of high velocity gunshot trauma.

In this case, the blasting caps had fuse wire leads that were electrically initiated via a power strip. The explosive compounds within

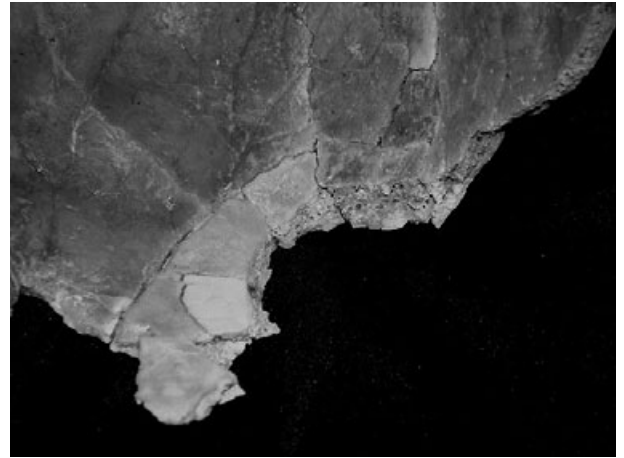


FIG. 4—Example of internal beveling in the left temporal-parietal region.

the blasting caps were so powerful to completely shatter the cranial vault and obliterate some portions of the cranium. Similar to a high velocity gunshot bullet impacting a cranial vault, the explosion waves from the blasting caps caused an enormous increase of intracranial pressure from bilateral directions, instantaneously. Internal beveling, extensive fragmentation, fracturing with little or no permanent deformation, in addition to the outward lifting and displacement of bone fragments, provided the evidence to support high velocity trauma (3,4). However, in high velocity gunshot wounds, not only are these characteristics present, bullet wipe and powder soot are often found. Also, metal fragments are commonly found embedded in the bone and/or soft tissue (5). Neither of these two characteristics was observed in the radiographs or during trauma assessment. Therefore, in this case, without the crime scene evidence which indicated blasting cap suicide, the trauma characteristics may have been misinterpreted as a through-and-through high velocity gunshot wound with no accompanying artifacts.

In conclusion, the importance of teamwork is essential in such cases, especially when the decomposition of the remains affects the overall outcome of the autopsy examination. Although cause and manner of death were relatively straightforward in this case, the assessment of the cranial trauma by forensic anthropologists corroborated the evidence collected by law enforcement personnel, investigators with the coroner's office, and the forensic pathologist.

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