Thesis Abstract

Analysis of Factors Which Affect Radiographic Detection of Gunshot Trauma in Skeletal Remains

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A difficulty in forensic cases for the medical examiner or forensic anthropologist is interpreting trauma as a gunshot wound (GSW) or blunt force trauma (BFT). This difficulty occurs when the remains are not complete, are highly fragmented, present atypical trauma patterns or have been exposed to taphonomic processes. Radiopaque materials, or ROM, (e.g., metallic fragments from the bullet observed on radiographs) can serve as an indicator of a gunshot defect, aiding in trauma interpretation useful in providing contextual information into cause or manner of death.

Materials

Each pig head (15) was shot three (3) times from different angles. Of the 15 pig heads, eight were shot using hollow point (HP) ammunition. The other seven pig heads were shot 3 times using full metal jacketed (FMJ) ammunition. An additional 8 slabs of ribs were used, with half the rib samples shot with each ammunition type. Each slab was shot 4 times. The skeletal remains of 21 donors from the Texas State Donated Skeletal Collection were also examined.

The weapon used in this experiment was a 9 mm caliber Springfield XD handgun. The ammunition was 9 mm caliber hollow point bullet and full-metal jacketed rounds, shot from a firing distance of 8 feet.

Methods

The hog samples were radiographed after they were shot (phase 1) and set at the Forensic Anthropology Research Facility in San Marcos, Texas to decompose. They were, again, radiographed after decomposition/mummification (phase 2) and after maceration/processing (phase 3).

Results

The data were run using the SAS statistical program. There were no significant differences between bullet type and ROM at any treatment phase for the crania. The HP ammunition produced more ROM fragments which decreased in detection frequency from phase 1 to phase 3 but at a slightly slower rate than the FMJ ammunition.

Conclusion

This research shows that where the bullet penetrates in the body, the type of ammunition used and the condition of the remains during analysis play important roles in the detection of ROM in gunshot defects.

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