



Physical Anthropology Section – 2007

H28 When the Bullet Hits the Bone: Patterns of Gunshot Trauma to the Infracranium

Katharine A. Chapman, BA, Texas State University, Department of Anthropology, 601 University Drive, San Marcos, TX 78666*

The goal of this presentation is to survey the basic principles of gunshot trauma and its effects on bones of the infracranium. Attendees will also learn the intricacies of a graduate student's anthropology research project involving pig carrion and guns.

This presentation will impact the forensic community and/or humanity by addressing the lack of information involving gunshot trauma to the bones of the infracranium. In forensic anthropology today, there is a great amount of data surrounding gunshot wounds (GSW) to the skull. The orientation and composition of the squama allows for distinctive and predictable damage. However, the skull is not always the object of trauma in a homicide. Many times the only physical remains the anthropologist has to examine are sections of long bone or other portions of the skeleton. It is here that a dearth in information could be detrimental to the science. The overall goal of this project was to add an important section to the science of forensic anthropology with the understanding of gunshot trauma to the infracranium.

The amount of trauma sustained in a GSW is determined by the loss of a bullet's kinetic energy. Kinetic energy of the bullets is equal to half of its mass multiplied by its velocity squared, or $KE = (1/2)mv^2$. These variables were tested using weapons and ammunition with different calibers, weights, jacketing, and muzzle velocities. The three weapons examined were the AK-47, the .308 Winchester, and the 9mm pistol. These weapons were loaded with a .30 caliber 123-grain hollow point bullet, a .308 caliber 168-grain hollow point bullet, and a 147-grain bonded hollow point bullet, a 124-grain full-metal jacketed bullet, and a 115-grain non-bonded hollow point bullet, respectively.

Five pig carrion were shot under controlled conditions by an officer of the Comal County (Texas) Sheriff's Department. The pigs were radiographed and then macerated to examine the underlying osteological trauma. Both methods of examination supported the hypothesis that specific types of weapons and ammunition result in specific patterns of trauma. An overwhelming amount of trauma occurred on the bones of the pigs shot with the high velocity weapons, while the remains of the pigs shot with the low velocity weapon sustained relatively little fracturing.

After further examination, it will be possible to predict the amount of trauma incurred by specific guns and ammunition. With some standardization, it should be possible to utilize this information to infer class of weapon that results from ballistic trauma in forensic cases. The overall goal of this project is to add an important section to forensic anthropology with the understanding of gunshot trauma to the infracranial skeleton.

Gunshot Trauma, Infracranium, Kinetic Energy