



Physical Anthropology Section - 2014

H39 A Rare Case of an Intact Bone Plug Associated With a Gunshot Exit Wound

Julie M. Fleischman, MS*, 655 Auditorium Drive, Rm 355, East Lansing, MI 48824; and Cate E. Bird, PhD, 4714 E Halifax, Mesa, AZ 85205

The goal of this presentation is to report on the findings of a rare case of an intact bone plug associated with ballistic trauma to the cranium of an adult male exhumed from a human rights case in Lithuania.

This presentation will impact the forensic science community by addressing variations in manifestations of gunshot wounds in skeletal remains and the continued importance of precise archaeological excavations of mass graves.

Between September 1944 and April 1947, 767 individuals were executed by the Soviet security police in Vilnius, Lithuania. After the executions, victims were buried in clandestine mass graves at the former Tuskulenai Estate, a former palace from the 16th-century located on the outskirts of Vilnius. The Republic of Lithuania regained its independence from the Soviet Union in 1990, and in 1993 Soviet security documents were discovered indicating the presence of mass graves on the Tuskulenai Estate. Excavations of the estate in 1994, 1995, and 2003 exposed 45 mass graves, each containing between 1 and 154 individuals. Skeletal analysis revealed a total of 724 individuals, including 720 males and 4 females. Approximately 97% of these victims demonstrated evidence of peri-mortem trauma, which included gunshot wounds, sharp force trauma, blunt force trauma, or a combination of these traumatic mechanisms.

In 2012, skeletal trauma in 155 individuals in the Tuskulenai case was analyzed. During this analysis, individual number 626, an adult male, was found to have a single, execution-style gunshot wound to the left occipital with a posterior-anterior trajectory. Both an entry and exit wounds were observed, and a deformed bullet was recovered with the remains. The circular gunshot entrance wound measured 6 millimeters in diameter and demonstrated typical internal beveling associated with the entry of a ballistic projectile. An associated exit wound was observed on the right frontal bone. This circular exit wound measured 9 millimeters in diameter and displayed a broad, external bevel.

Additionally, a disarticulated, but intact plug of bone belonging to the exit wound was recovered with the remains. The circular bone plug measured 20 millimeters on its ectocranial surface and 9 millimeters on the endocranial surface. When re-articulated, this plug fit securely into the exit wound. Four small linear fractures extended through the external surface of the plug, but these fractures did not extend to the internal surface. This fracture is consistent with the bone failing on the tensile side first but not on the compressive side. The projectile likely lost its ballistic energy, causing plastic deformation at the exit wound site, where the initial failure occurred on the external surface. This fracture pattern is more consistent with blunt force trauma than with ballistic trauma.

This study presents an unusual case of gunshot trauma observed on the skeletal remains of an executed individual from a post-World War II human rights context. The bullet entered the cranial vault posteriorly, lost its ballistic energy, and caused plastic deformation at the exit site, consistent with blunt force trauma. In turn, the displaced bone plug associated with the exit wound failed on the tensile side of force, but not on the compressive side, permitting its complete recovery. This study contributes to the forensic community by providing an in-depth examination of alternative manifestations of typical plug and spall formations associated with gunshot exit wounds in bone. Additionally, this study demonstrates the necessity of systematic archaeological excavations of mass graves. Without meticulous excavation, both the bone plug and the bullet might not have been recovered from the grave.

Gunshot Wound Trauma, Plug, Mass Graves