



Physical Anthropology Section – 2003

H8 Back to the Basics: Anatomical Siding of Fragmentary Skeletal Elements From Victims of the World Trade Center Disaster

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After attending this poster presentation, participants will learn: (1) methods used for the identification and anatomical siding of human remains from victims of the World Trade Center; (2) the practical utility of having visual and comparative reference material readily available when identifying fragmentary skeletal elements; and (3) the value of physical anthropologists in the mass disaster setting for identifying fragmentary, burned, and commingled remains. This presentation will further provide hands-on opportunity for participants to assess various methods (published and unpublished) used for the anatomical siding of fragmentary skeletal elements.

The identification of skeletal elements employs the absolute basics of human osteological methods used in the laboratory and field setting, and generally precedes assessments of sex, age, ancestry, stature, and identifying characteristics. When dealing with a single individual, identification of skeletal elements is straightforward, although taphonomic factors may complicate analyses. However, for mass disasters the death toll is high and may involve a long process of identification for remains that are in a heavily fragmented state.

Human osteological training provides the basic skills needed for the identification and anatomical siding of skeletal elements, as well as a comprehensive understanding of their orientation within the body. When more detailed methods are needed for assessing highly fragmentary and/or burned remains, closer attention to skeletal anatomy together with use of comparative material is often necessary in order to accurately identify and side elements.

The terrorist attacks of September 11, 2001, resulted in the deaths of 2,823 victims at the World Trade Center (WTC) in lower Manhattan, representing the worst mass fatality in U.S. history, and producing nearly 20,000 individual body parts with varying levels of fragmentation and decomposition. After the initial search for survivors, the daunting task of recovering human remains from the site was undertaken. A multidisciplinary team comprising pathologists, anthropologists, odontologists, fingerprint and DNA specialists, and identification staff was established to facilitate the identification process at the Office of the Chief Medical Examiner in Manhattan (OCME). Human remains were recovered from September 2001 through July 2002 from the WTC site, with a simultaneous secondary recovery effort at the Staten Island Landfill where debris was brought from the site to be sifted and screened for further remains. The fact that thousands of remains arrived at the OCME over a ten month period in a highly fragmented state, and were in many cases, incompletely recovered, prevented calculations of the minimum number of individuals (MNI) represented.

The unusual circumstances of two hijacked commercial airliners, fully loaded with jet fuel, impacting the 110-story North and South WTC towers, followed by their subsequent collapse and the collapse of five other adjacent commercial buildings, introduced a multitude of taphonomic factors that complicated the positive identification of individuals. These included the mutilation, fragmentation, and amputation of body parts, extensive decomposition and natural mummification, commingling, the effects of fire destruction, and further damage incurred through the use of earth-moving machinery during the recovery effort.

The extent to which remains were fragmented, burned, and/or decomposed hindered efforts to identify and anatomically side body parts, and further complicated interpretations of commingling. Because of the high incidence of commingling resulting from the collapse of the WTC complex and from recovery efforts to remove more than 1.6 million tons of debris from the site, the accurate siding of fragmentary remains proved to be an important component of the identification process. In the process of anthropological verification of remains following their original assessment, every attempt was made to identify and side fragmentary and burned remains through the use of comparative skeletal material, osteology textbooks, and methods developed throughout the course of the identification process.

A variety of texts provide excellent detailed information for the anatomical siding of fragmentary skeletal remains using a variety of methods (e.g., Bass 1995, White 1991; Steele 1989). However, these sources may not be practical or readily available in the mass disaster setting, where time is often the greatest constraint and accuracy is the most important goal. The degree to which remains were fragmented, burned, or decomposed, along with the sheer number of individual cases assessed, presented practical problems for attempting to side fragmentary remains. This was particularly evident when common anatomical features typically used in identification were either missing, difficult to assess due to the presence of soft tissue, or were heavily charred or calcined. This presentation will focus on several methods used for the anatomical siding of fragmentary remains as part of the anthropological verification protocol for the WTC disaster, and will further discuss practical applications in forensic anthropology.

Forensic Anthropology, Human Identification, Mass Disaster