



## Physical Anthropology Section – 2011

### H5 Blast Injury in Skeletal Remains: The Case of a Soldier From WWI

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After attending this presentation, attendees can expect to gain an understanding of the utility of unusual occupation pathologies as an individuating characteristic in historical missing person's cases. Attendee will also learn about the patterns of blast trauma injury that can be identified in cases of suspected blast injury, as well as, be able to discuss the potential of the combination of blast trauma analysis and forensic anthropological techniques for historical cases such as the one presented.

This presentation will impact the forensic science community by demonstrating the need and potential for the application of blast trauma identification and analysis in forensic anthropology. This presentation demonstrates that forensic anthropologists should be familiar with this type of trauma as it can be identified in a variety of contexts in which the forensic anthropologist may be called to contribute. The lack of knowledge in the field is stressed to outline the importance of undertaking research on this type of trauma due to its relevance in many forensic and anthropological situations.

Recent years have seen increasing attention given to the analysis of many types of skeletal trauma; however, injuries to the skeleton caused by explosions remain poorly understood. The results of a project with dual objectives aimed at both identification of a specific individual killed during the Great War (1914-1918) and understanding the cause of their death are presented. Assisting in the identification of remains excavated in 2008 from Plugstreet, Belgium, the remains were located buried *in situ* in proximity of the location of the German front lines during the Great War at St. Yvon, north of the Ultimo crater. The remains were fully clothed and found buried under soil in a trench. The remains were accompanied by artifacts such as personal effects, munitions, medical supplies, and a souvenir Pickelhaube. These artifacts clearly indicated that this was not a proper burial and the individual was killed at that location.

Anthropological analyses were performed to determine the age, sex, stature, and pathology of the remains. A number of individuating characteristics were identified regarding age and physical type as well as occupationally-related pathological changes. The biological profile indicated that the individual was a male with a stature ranging between 5' 7" and 5' 10", aged between 30 and 40, which narrowed down the potential casualties due to the older age of the individual, a characteristic which was at odds with the typical enrollment age of soldiers of the time. The skeletal remains also indicated a bone robusticity that suggesting that the individual participated in a physically-demanding occupation during his life. This observation was further supported by the extensive occupationally-related pathologies observed on the vertebrae, illustrated by arthritic changes and prominent Schmorl's Nodes, and arthritic joints of the legs. These pathologies are unusual for an individual of this age

and can provide interesting information to add to the identification. Collectively these observations permitted the exclusion of all possible identities with the exception for a small number of individuals. The anthropological analysis was combined with a stable isotope analysis and a subsequent DNA match to identify Private Alan James Mather, a grazier or rancher from Inverell in New South Wales, missing-in-action from Messines, Belgium since June 1917.

Of further interest was a range of evidence for severe skeletal trauma consistent with the individual being hit by a mortar. Laid out anatomically, distinct injuries were located on the upper left side of the body and torso. Path of injury could be accurately located and followed through the absent humerus and sternum, and the extensively fragmented ribs. Elements in close association to these, such as the manubrium and right arm bones, were completely intact, indicating a very specific path of injury, ending in the torso. Fragments of mortar shell were found embedded in the left temporal bone and left scapula. A large fragment, with an intact driving band (typical of German rifled mortars), was found in the associated grave fill, along the left side of the skeleton, which had been included in a bag of skeletal elements from the upper arm. Subsequently examined historical and archaeological information supports the evidence examined and contributes to the positive identification. Historical records confirm that on June 8, 1917, Private Mather's 33 Battalion was hit by mortar fire. This exemplifies the application of blast trauma analysis by a forensic anthropologist to a historical case. This case illustrates the potential for additional work in this area to further expand understanding of this class of skeletal injury which remains equally relevant in modern contexts.

**Forensic Anthropology, Blast Trauma, Occupational Markers**