H92 New Tools for the Processing of Human Remains From Mass Graves: Spatial Analysis and Skeletal Inventory Computer Programs Developed for an Inter-Disciplinary Approach to the Re-association of Commingled, Disarticulated and Incomplete Human Remains

Hugh H. Tuller, MA, Joint POW/MIA Accounting Command, Central Identification Laboratory, 310 Worchester Avenue, Hickam AFB, HI 96853-5530; Cecily Cropper, BSc*, Ute Hofmeister, MA*, Laura Yazedjian, MSc, Jon Sterenberg, MSc, and Jon M. Davoren, MA*, International Commission on Missing Persons, Alipasina 45a, Sarajevo, 71000, Bosnia and Herzegovina*

The goal of this presentation is the introduction of two computer programs that can potentially assist mortuary personnel in the re-association of numerous disarticulated body parts through inter and intra-site analysis for purposes of facilitating identification and increasing efficiency of a large scale DNA identification process.

This presentation will impact the forensic community and/or humanity by demonstrating the use of computer database programs by all professions involved in the identification of human remains from mass graves.

The means of deposition of human remains within mass graves often leads to a large amount of disarticulation, commingling and incomplete bodies. While 'routine' cases are usually processed in stages by separate forensic disciplines, often in separate locations, the simultaneous processing of hundreds to thousands of human remains from mass graves can be overwhelming if a similar system is employed. The complexities of recovery, recording, and processing large amounts of disarticulated remains require innovative solutions that integrate several disciplines. This panel wishes to present to the forensic community a process by which data recorded during the recovery and examination of remains from mass graves may be used to assist in the re-association of disarticulated human remains.

The first database application involves spatial analysis of commingled, disarticulated and incomplete bodies. Contemporary methods of mass grave recovery operations often include the electronic three-dimensional recording of bodies, body parts, artifacts, and related feature location and position. From these locational points, maps can be created to represent the crime scene or to reconstruct the sequence of events, including separate depositions of remains from a number of primary graves. However, the use of the data points does not have to end with map making. These locational points may also be extremely useful in guiding re-association efforts of disarticulated remains on the large scale needed at mass graves. The electronic survey data can be queried to generate a list of a particular body part, in order of distance, which may belong to a specific body missing that element. The premise is that the closest disarticulated body part to a body missing that particular part has a higher probability of being the correct match than all other same body parts at the site that are further away. The resulting list has the potential to save hours of work by providing mortuary personnel with an inventory of the nearest targeted body part to aid in re-association with a body. Instead of having to randomly search through all potential body part matches the mortuary worker can use the generated list as a starting point in their search for the most likely match.

The second application involves a comprehensive visual skeletal inventory that again can be queried for purposes of re-association. During initial examination of remains mortuary personnel can record all present body elements for each case they work on in the skeletal database. After all cases have been recorded the mortuary worker can then query the database for all the potential matches to a particular body part or body missing that element. Combined, the spatial analysis and the visual skeletal database may prove to be important tools in strengthening the efficiency of re-association and identification of complex and large scale sets of human remains.

With the success of mass scale DNA testing, DNA analysis of all elements recovered is possible. The unfortunate down side of DNA analysis is the cost of the process. While recovery and identification missions of mass disasters in the United States and other developed nations are usually well enough funded to cover the cost of such testing, this is not true of most less developed or post-conflict countries. The desired effect of such databases is a decrease in unnecessary DNA sampling and analysis, and an increase in overall processual efficiency.

The presenting panel made up of Recovery, Mortuary, DNA, and Database personnel will provide examples of the use of spatial analysis and skeletal inventory database programs with remains recovered from mass graves. Each panelist will describe his or her role in the processing of the remains and how the programs integrate into their work.

Database, Commingled Remains, Re-association

 ** Presenting Author*